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THE MEASUREMENT OF INTERESTS

IN RELATION TO HUMAN ADJUSTMENT

BY

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With an Introduction by

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To
Lorine

PREFACE

THE cultural importance of interest measurement, which is emphasized throughout this book, is only now becoming recognized. We have so long regarded abilities as the criterion of life's success that we have neglected the philosophy of happiness. To view interest measurement in true perspective we must start with an assumption different to the one current in this commercial age in which successful accomplishment is the criterion of measurement. Happy accomplishment is the foundation of a modern individualistic philosophy. Interest measurement is concerned with a distribution of interests which this philosophy assumes as the basis of happiness. The significance of interest measurement lies not in its relation to social efficiency, but rather in it measurement of a cultural development which is related to social happiness.

The psychology of interests, their measurement and their importance in human adjustment, has engaged the attention of the author for almost ten years. During these years the measurement of interests has gone forward at a rapid pace. A decade ago there were no inventories and tests of interests. The early forms of many of those that we have today were just being given an experimental trial. The assembling of these researches upon interests, during times when the investigations were in process, has been an exciting task. Nothing is more interesting to observe than development. The results of one investigation dovetailed into those of another. Generalizations and theories took form as researches were completed. A new field of measurement emerges. This is the story of the last decade in interest measurement.

Interests have been divided into subjective and objective interests according to the method of approach in their measurement. Chapters I to VII inclusive are concerned with subjective interests, and VIII and IX with objective interests. An aim of the author was to include between the covers of one

book all that is of quantitative value upon these two experimental developments of interest measurement before it was entirely lost in the files of journals and unpublished manuscripts. This aim is largely realized as far as the period 1920-1930 is concerned. Prior to 1920 the thread of development has been traced backward as the early quantitative studies of interests were shown to be important for adjustment purposes. In following out this plan the book has become biographical to a degree. References to all original sources are recorded for historical reasons. What at times may appear to be extraneous material, such as scoring keys and forms of test administration, is included because of the influence it may have upon future measurement.

The historical record of interest measurement will be found in the first nine chapters. The author has purposely not included the measurement of "attitudes" and "values." Such measures appear to belong more properly to the field of general habits, although the aim of this measurement is not as yet clearly defined. Also, the measurement of emotions and of motivation has properly been excluded. Interest measurement, as it is conceived in this book, has a definite development in scope and definition. A theory of interests, which is based upon this development, appears in Chapter X as "an acceptance-rejection theory of interest measurement."

In only one instance does the author feel that he did not trace developments back to beginnings. Exact records of the early history of the measurement of objective interests by means of the information test (Chapter VIII) seem to be irretrievably lost in the reports of the Army work in psychology.

The author is enthusiastic over the practical application of interest measurement. Chapter XII outlines the practical applications of interest measurement in the interview and in the individual psychological examination. But a word of caution is necessary. The use of interest measures in recommending human adjustment requires great care. Attention is called to the need for a conservative policy in several chapters, particularly where a prediction of future interests and of abilities is desired. Vocational and educational guidance have gone astray

here. Chapters V to VII deal with this problem. The value of interest measurement will surely be recognized. But one who has watched the errors on the practical side of measurement cannot but be cautious in the use of all forms of psychological measurement.

While credit has been given throughout the book for the vast amount of published material, a number of individuals have contributed a great deal of material that is unpublished. Among these should be mentioned the research by P. P. Brainard reported in Chapter II on "The Specific Interest Test," work by L. D. Hartson and W. H. Brentlinger in Chapter II upon "The Oberlin Vocational Interest Inquiry," the large amount of research by Clarence S. Yoakum and his students at the Carnegie Institute of Technology reported in Chapter III, work by E. K. Strong, Jr., included in Chapter IV, and by D. G. Paterson and M. M. Jacobsen in Chapter VII. The author has had the advantage of talking with various investigators while their investigations were in progress. He wishes to thank all those who have contributed to this book through correspondence and discussion of their projects, in both tentative and completed form. Appreciation is expressed to Miss Helen Sheehan for the exacting work performed by her in the preparation of the manuscript. The following have read portions of the manuscript: L. Dewey Anderson of Western Reserve University, William H. Burnham of Clark University, Harry Dexter Kitson of Columbia University, L. J. O'Rourke of the United States Civil Service Commission, Lorine Pruette of New York City, Frank L. Shuttleworth of Yale University, E. K. Strong, Jr., of Stanford University, Lewis M. Terman of Stanford University, Herbert A. Toops of the Ohio State University, Morris Viteles of the University of Pennsylvania, Clarence S. Yoakum of the University of Michigan. Grateful acknowledgment is made to these individuals for their criticisms and suggestions for the improvement of a book which has the disadvantages as well as the advantages of being written so very close to the time of the development it portrays.

D. F.

New York University,
January 1, 1931.

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INTRODUCTION

BOTH the amount and the direction of one's life accomplishments are determined largely by the factor of interest. Binet once pointed out that the world is as much a battle of wills as of intellects, and he might have added that wills are moved to action by the dynamic power of interests. For understanding an individual's total personality it is absolutely necessary to know something about the kinds and the intensity of his interests. As long as this knowledge is lacking, neither educational nor vocational guidance can have a solid foundation.

Formerly it was naïvely supposed that to secure this information for a given person it was only necessary to ask him to rate the strength of his interests in the school subjects, the leading occupations, various typical kinds of activities, etc. It has been found, however, that this method has very serious limitations. It can never be relied upon safely, and in the case of children its results are likely to be entirely misleading. The child's experiences are too limited for him to know in what directions his interests most naturally tend. Even the high school youth has little informational basis for estimating the relative strength of his interests in the adult occupations; he knows too little about the exact work they involve or about the skills they require. Even his estimates of the interest he has in the school subjects are likely to be highly colored by such extraneous influences as opinions of classmates and personal liking for the teacher.

The unreliability of subjective estimates regarding interests is largely responsible for the widespread opinion that interests throughout childhood and youth are subject to such kaleidoscopic changes as to be almost valueless for predictive or guidance purposes. It is true, as Dr. Fryer has shown, that the statements which children make about their occupational or school subject interests do change greatly from year to year. One can see how this might be the case even if the fundamental

characteristics of each child's interests were highly permanent. At any rate we can not be sure that such is not the case until interests have been measured by methods much more subtle and searching than the crude subjective estimates formerly relied upon.

The objective measurement of interests becomes, therefore, a matter of great importance. During the last decade the problem has been attacked in many experimental investigations, some of which have yielded results of considerable value. Unfortunately the published reports of these studies are so widely scattered in the numerous psychological and educational journals that it has been very difficult for the student to orient himself in the subject or to make effective use of the work that others have done. For some time a book has been needed that would present in convenient form a critical and interpretative summary of all the investigational studies that have been made in this entire field. *The Measurement of Interests* has been written to meet this need.

It seems to me that Dr. Fryer has performed his task admirably. He has envisaged the problem in its psychological setting and has made this setting clear to the reader. The investigational literature has been so thoroughly canvassed that few if any important studies having direct bearing on the problem have been omitted. In his summaries the author has avoided the common mistake of quoting results and conclusions without giving an adequate account of the experimental procedures on which these were based. He has not hesitated to give his critical valuation of the studies reviewed, but he has been careful to give the reader enough details to enable him to form a judgment of his own. If the book had been modeled on the *ipse dixit* style, it could have been much briefer; its value as a text, however, would have been incomparably less. In the vast majority of cases I find myself in close agreement with the author's criticisms and evaluations. In the rare instances in which I might feel inclined to take issue with him, I recognize there is ground for a difference of opinion.

One of the most important facts to be gleaned from this book is that the best objective measures of interests fluctuate from year to year much less than do subjective estimates. To

what extent the fluctuation would be further reduced if our measures were perfect, it is at present impossible to say. My own opinion is that improvements in measurement technique will show that interests possess a far greater degree of constancy than most of us have been inclined to attribute to them. Whatever later researches may disclose in this regard, it will be generally agreed that the interests even of the immature child are educationally and perhaps also vocationally very significant. The studies which have been made in this field can not be safely ignored by anyone who is concerned with the problems of counseling or guidance. Dr. Fryer's book deserves wide use as a text with classes both in psychology and in education.

LEWIS M. TERMAN.

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THE MEASUREMENT OF INTERESTS

CHAPTER I

SUBJECTIVE INTERESTS

Look at a rocky New England field, the bare, rolling plains of the Middle West, or the towering outlines of mountains; look at a single clump of trees; then turn and observe an audience of human beings. As people sit and listen to a speaker their faces vividly illustrate the differences between themselves and inanimate objects; by their expression we say that they are interested or not interested, by the way they sit we tell whether they are reaching out toward the speaker or holding back from him. This capacity to feel interested is an important characteristic of living creatures. It can be observed in the quivering nostrils of dogs following game, the arched neck of horses when some new sound is heard in the pasture, the grunting of pigs who come to the trough, the curving lines of a snake ready to hack; it can be observed in the baby who reaches out toward the light and gurgles when a favorite toy is presented.

Living creatures respond to the environment by active degrees of interest or aversion, by movements toward or away from the exciting stimulus. Scientists sometimes appear to regard the human being as so much passive clay to be shaped and molded by outside influences. It is true enough that the human being is a responding mechanism of a complex sort. His sensory equipment makes him capable of a variety of responses. Through his hearing he responds to the sighing of the wind in the treetops, to the melody of a violoncello or the imperative summons of a factory whistle. By his sight he is able to obey the traffic signals, recognize a loved one at a distance, and read the records of a thousand years. By smell he avoids certain putrefying or noxious substances; taste contributes to his discrimination of foods. By tactile and kinæsthetic equipment he is able to perform many complicated occupational tasks; a good cashier can make change without looking at the coins because

her fingers are able to discriminate, and a good workman detects flaws in a product simply by passing his hand across it. By means of his intricate and fascinating nervous system man receives many sensations and makes many responses; he may quite truthfully be described as a reacting mechanism.

But this is not the full story of man's adjustment to life. We must not neglect the fact that the human organism goes out to meet the objects of his environment which can stimulate him to a final reaction. When he goes out to meet stimulation we say that he is interested. All animals do this to an extent, but as the evolutionary scale is climbed there seems to be more and more of this going-out, this interestedness, increasing with the complexity of the organization. One of the things which makes a dog so companionable to man is the number of his interests, but this is a slight thing compared to the variety of interests of man himself.

It would be very difficult to get through the day without remarking in some way on this capacity of man to be interested. The latest murder in the paper "interests" us, the new building going up on Main Street "interests" us, the width of men's trousers and the length of women's skirts "interest" us. We condemn a speaker by saying he is not "interesting," we kill the chances of a book by calling it "uninteresting," we doom a man or woman to social oblivion by agreeing that he or she is "not interesting"; we classify our courses in college according to "interest," select careers on this basis, and resign a job because it does not interest us. The most terrible pronouncement which Queen Victoria reserved for special occasions was the royal statement, "We are not amused," by which she meant not interested, and after which, no doubt, many a courtier felt like curling up and dying, at least temporarily. Disraeli gained such influence over the old Queen because he knew how to talk her language, to keep her "interested." The old saw, that he who makes the best mousetrap will find the world beating a track to his door, may or may not be true, but it is certainly true that he who interests the world will not be left to languish in solitude. In all the occupations where personality is the key to success, it is the interesting personality which gets the rewards.

In social life, in personal adjustments, in education and in

the occupational world interest is the vital key to many important situations. We all want to be *interested,* and we want to be *interesting,* that is, we want to be moved to act upon the world in a satisfying manner, and we want the world to react toward us in an equally satisfying fashion. We are only now beginning to realize that the quality of being *interesting* may be cultivated; it has its development in each of us along with the growth of the capacity of being *interested.*

THE INTERESTS OF THE INDIVIDUAL. We have perhaps been too long concerned with abstract considerations in our attempt to understand the interests of the individual. We need to see these psychological factors in concrete form in order to understand them. The interest life of the individual is rich or bare according to his social background. Our training, the environment in which we live, determines, perhaps more than anything else, the number, kind and complexity of our interests.

Here is a man with extremely varied interests, a man who is now definitely committed to a career of college teaching. But between the ages of thirty-five and forty-five, after writing his interest autobiography, his teaching field has shifted from history into economic history and finally to economics. This man had an adventurous youth and an unorganized education, with no school instruction until he went to college at the age of twenty-two. This is perhaps a good environment to produce the variety of interests which he mentions in writing his interest history.

A classification of interests, taken from his history, illustrates very well what is found in many interest histories.

SUBJECT 1. INTERESTS EXPRESSED IN INTEREST AUTOBIOGRAPHY[1]

Male, Single, Age 37, Ph.D. Degree

Mechanical

1. Took locks, guns, etc., apart when very young.
2. Early automotive "fan" during adolescence.
3. Owned one of earliest motorcycles.
4. Amateur machinist.

[1] An interest autobiography from an unpublished study by the author, part of which is reported in Chapter XI.

5. Learned locksmithing in two weeks. Subsequently regularly employed in this trade.
6. Interested particularly in motor vehicles at age of 20.
7. Learned with high degree of skill shorthand and typing. Regularly employed at this work.
8. Mechanical engineering course taken by correspondence at age of 20.

Sports

1. Desired to be explorer when very young.
2. Hunting, cycling, and "bumming" during adolescence.
3. Cycle and motorcycle racer at age of 20, with success.
4. Mechanic on racing car.
5. Traveled in Europe at 25.

Musical

1. Enjoyed music from birth.
2. Played violin by ear.

Remedial

1. Wished to "help world" at age of 25.

Scientific

1. Biology and zoology at age of 30.
2. "Society as a science" at age of 30.

Linguistic

1. Read romances and mild philosophy when 7 or 8.
2. Memorized verse copiously during adolescence.
3. Fond of English classics during adolescence.
4. Read German early.
5. Enjoyed Latin fairly well (liked Latin sounds).
6. At age of 25 believed he had high literary ability.
7. Read widely in literature during college at age of 25.
8. Read biography at age of 30.

Personalities

1. Older brother stimulated reading when very young.
2. Tutored in various subjects from 11 to 16.
3. Older brother mentioned as influence toward systematic education at age of 20.
4. Enjoyed floating laborers and "bums" at age of 20.
5. Brother contemptuous of classics.
6. Friendship of president of college stirred interest in classics at age of 25.

7. Friendship of president of college secured accidental job in history at age of 27.
8. Through biology professor became interested in biology.
9. Positive influence of professor upon interest in sociology.
10. Brother interested in sociology.

Aversions

1. Going to elementary school.
2. Took and passed secondary school examinations and never entered.
3. "Home life unsatisfactory—fled."

A more fundamental general interest stands out in this genetic history, as well as these detailed interests specifically mentioned. It is one that seems to include many of the detailed interests. It is the interest in personality situations which guarantee him social importance. The subject was precocious in literary pursuits because of the "influence of older brother." He took examinations for secondary school and passed them, but did not go to secondary school because (interpretation) he was 16 years old and older than the average. His interest in a literary career was "perhaps way of being great some time." But he adds he has "no notion of making a living that way." This interest in situations giving him social recognition is probably reflected in the interest in memorizing verse, in cycle and motorcycle racing and to some degree in "bumming." The subject seems to have a strong interest in being different, which developed very early in a disorganized home and educational environment. He "ate up course" in college. He did not continue Latin because his brother was "contemptuous of classics." His social success in linguistics—in quoting literature, in repeating verse, in conversation, in learning languages, in conversing in foreign languages—led him at the age of 25 to have a "belief in his literary ability." He did not try to make any practical use of it, but he felt he had it.

His brother, who became an economist, represents the personality interest which led the subject into science. This interest was fostered by other personality influences—the president of a college, the professor of biology, and the professor of sociology. Without these personality influences, it is easy to conceive that the mechanical interests might have kept this

man in some occupation requiring skilled work with his hands —his wider interests being satisfied by reading and discussion. As it is, his occupation is confined to dealing with ideas, and his abilities with and interests in concrete things are utilized only avocationally and occasionally. Such a combination of interests would seem to point to a laboratory science as a satisfactory combination of activities, but actually, the movement from biology to non-laboratory sciences was prompt, by reason of definite bias toward the philosophical meanings of things and the possibilities of social recognition through his verbal abilities.

It is impossible to read this interest history and conclude that this man must have arrived at his present occupation if he was to be satisfactorily adjusted. He could have entered, it would seem, any one of several occupations, and achieved a satisfactory occupational life. Nevertheless, this detailed story of many interests shows a certain continuity. Interests grew on the basis of what had gone before; it seems that they would not have been what they were had the soil been different. However, any prognosis in the case of this man in earlier years would have been extremely difficult. Many possibilities were before him. External circumstances, what he calls "accidents," made the determination among the possibilities inherent in his own developing personality.

We will close the discussion of this interest autobiography with a paragraph from a letter written by the subject upon completion of his interest history.

> I've had so many (interests), I could keep thinking them up for months. Once I started out to be a jeweler, and would have been one pretty shortly, too, had my eyesight been equal to such close work—and my interest held!

AN INTEREST AUTOBIOGRAPHY OF A WOMAN. Another autobiography illustrates again the variety of interests making up the interest-life of the individual. This autobiography is of a woman who was twenty-seven years of age when the record was written several years ago. This history is included in the woman's own words. In this history are seen the number,

specificity, and genetic development of the interest experiences, which crowd into an educational or vocational choice.

SUBJECT 2. INTEREST AUTOBIOGRAPHY OF A WOMAN (EXPRESSED IN HER OWN WORDS)[2]

Married, Age 27, M.A. Degree

My first recollection is very vivid, but comes in the midst of a vacuum. I remember picking buttercups in the yard of my grandmother's home in the country, and bringing them into the bright, sunny kitchen where I vaguely remember my grandma was baking bread. I can very clearly see the little round glass bowl she took down from the shelf to put my flowers in. Circumstantial evidence leads me to believe that this was in my third year.

I do not know from just how early an age my attention was directed to literature, but there certainly exists in my mother's safety deposit vault, a book of poems (awful ones) which announces on the title page that the authoress is aged eight. And there must be no less than three different volumes of *Stories for Children* (privately printed, and illustrated by the author), all written between the ages of 7 and 10.

Probably no other interest kept up as steadily throughout my childhood and adolescent years, partly, I imagine, because it was constantly stimulated by the assumption of my parents that I was destined to be an authoress.

After the age of 10 (I think) I wrote more plays, some of which were performed by my playmates. (I blush to admit I usually took the title-rôle.) The last dramatic composition was written in my sophomore year in college. This and one just preceding it, given in an out-door theatre in California, stimulated a very keen interest in costume and stage design—a subject which still gives me great pleasure.

But poetry and narrative were not neglected, but turned out by the ream all through my high school days—most of the poetry addressed, alas! to idealized but existing school teachers, and most of the stories tales of imaginary families, mostly composed of talented and beautiful girls—the "intellectual" member of the family always more or less representing me! Curiously enough the habit of imagining in great elaboration the doings of fictitious families was an early game over paper-dolls and until a year or so ago, was a favorite device for putting myself to sleep. In college, I attempted literature more seriously but it soon became apparent to me that a tremendous number of eager young damsels—of mediocre talent—also had similar aspirations, and that the world needed no more only half-talented lit-

[2] From an unpublished study, part of which is reported in Chapter XI.

erature. Except for a few spurts, in recent years I have written nothing—and even the "spurts" were articles or essays connected with more or less academic work.

Of course, I was keen about dolls, not so much making their clothes, as imagining things about them.

I have always hated organized games of any kind—especially in recent years such things as card games, tennis, etc., but took a tremendous interest in childhood in less formal games like hide and seek. In view of that, it is very funny to picture me on a hot day in summer walking miles over the baking side-walks of Los Angeles, visiting the numerous playgrounds of that city, inspired by a missionary desire to fit myself for playground work. I actually conducted playgrounds during three or four years (afternoons and Saturdays) between the ages of sixteen and twenty, though I was never very successful at organizing anything more complicated than "Drop the Handkerchief." I wouldn't *look* at the best playground in the world today and I once knew all about the latest apparatus!

Esthetic dancing in college, though bad in gymnasium work which I despised; flunked ballet dancing.

School was never more than a mixed blessing in earlier times, mathematics and science giving it some of the terrors of a torture chamber. One of the big surprises of my life was getting all A's my first semester in college where the abhorred subjects were no longer necessary. Nobody had ever thought me very good in school before, and it came as a shock. Since entering college I have always enjoyed studying very much.

The things I liked best—always excepting English composition—were history and geography. I never cared a great deal for languages, except Greek (ancient) although I usually learned them very easily. In fact I used to scorn people in college who took languages—because I thought them easy. Greek—which I can no longer read—was once almost the enthusiasm of my life. Between the ages of 15 and 18, I spent much time reading the Anthology and acquired a very romantic attachment for the Greek of the past. Recent acquaintance with classical archæology has entirely reconstructed my view of the life of the time and quite abolished the romantic illusions, but has, if anything, increased my interest in the culture and thought of antiquity (including Roman history, by the way). During the same period, 15 years old, I read several books on Egyptian archæology, through acquaintance with a young explorer of Egyptian ruins.

The interest in geography still persists. It is still a diversion to me to study maps of relatively unknown parts of Asia or Africa, and to read accounts of journeys to Samarkand or Uganda. I'm sure that a part of the anthropological interest of later times (last 2 years in college) arises partly from a geographical interest, for I never was so happy (before I was married—that's true) as when I was

making a part of an enormous detailed map of Africa to be used at the Versailles Conference (it never was!). I doubt if my interest in travel, which is, however, very keen, is very much tied up with this, for I haven't the least desire to go to the places that geographically interest me the most.

The fact that I started out to major in psychology instead of English or history or geography as anyone might naturally suppose, was due in the first instance, I am sure, to a fascinating lecture given by the principal of our high school, and was afterward maintained, first, by a warm affection for the old professor who gave the introductory course I took, plus the pleasant literary style of William James, and later by a romantic interest in a young psychology professor. As I got into the field, I thought it duller and duller, and in fact, did anything but shine in the experimental work I was required to take.

This left me, at my junior year with no major, and through the accident of circumstances I had to decide on economics which seemed equally dull. During that year I took anthropology, which in its turn took me—literally by storm. Partly the professor, no doubt, but also the study of society in its manifold aspects seemed infinitely fascinating. Economics never got hold of me in a similar way at all (though my honors came in that field, it is perhaps fair to say I did revel in authority). The anthropology interest is still pretty strong but not the keenest now.

Although my brother and I wrote sermons at very tender ages, I doubt if I had much interest in religion until I was about 15. Then I got some queer notion of purification and Lent and I used to read a chapter of the Gospel of St. John every night before I went to bed and rub my face with cold cream (not for beauty!). This soon passed, and when I joined the church a few years later, it was because it had become fashionable among the girls I went with to be in love with the young assistant pastor.

But in college—my sophomore and junior years—religion became a really predominant interest. I went regularly—even assiduously—to the Episcopalian church (I think the really esthetic building and service were important), became a pillar of the Y.W.C.A., and even considered being a missionary. I think the ceremonials were a big part of the interest, but so also were the *lengthy* discussions of religious philosophy, etc., in a course I took and with my roommate. It is really hard to exaggerate the importance of this interest for about a year. In between times and since then the religious interest has been pretty well below par (except for primitive religion).

But directly connected with the religious enthusiasm has always been an interest in "social reconstruction." I think I've had this ever since I can remember, probably as a result of home training. This, in a time of great mental unrest among the young, resulted in a

couple of years—nearly three (21-24)—in a pretty keen interest in radical doctrines, especially as regards the distribution of property. Undoubtedly the knowledge of economics contributed here and made possible the teaching of sociology. I wasn't a very bad "red," but I read most of the journals, Bertrand Russell's books, and pretty near declared myself a guild socialist, and got in wrong at Oxford for an essay on property.

The interest in housework is entirely the result of matrimony. I enjoy cooking (my husband says I do it well), even cleaning, etc.

Certainly for fifteen years I have been very interested in children, and they have nearly always seemed to enjoy playing with me.

In childhood, I hated my clothes for I thought them ugly; in earlier adolescence, I thought it improper to be interested in them; I now care a great deal both about my own and other people's. Sometimes movies or musical comedies make their only appeal through the good-looking clothes of the ladies (my interest in men's apparel is recent and forced!).

Household decoration is also a fairly recent acquisition but surely goes back to the first time I contemplated matrimony (some 5 years ago) and the gentleman wanted a colored glass lamp and I shivered at the prospect. Now a big interest.

Social life doesn't thrill me much unless I'm giving the party. Chief diversions at present eating and picnicking (don't know what they would be if circumstances allowed more).

Brought up to be interested in music, but purely from listener's side. Lack of mechanical powers consistent throughout life (especially lack of physical coördination). Am still very much interested, but no longer feel as competent a critic as in my college days!

Have always cared a great deal for poetry—my taste less for modern poetry than in college days.

Never have been as much interested in novels as poetry—though it was novels I wanted to write, or stories.

Always have wanted to create something, but have always been discouraged by teachers, etc. Formerly made clothes, hats, and stage costumes (but not well). Have now found just the thing in painting Xmas cards and labels on flour tins, prune boxes, etc., and in mounting photographs. Perfectly happy.

Used to consider interest in art anti-social but had constantly to choke it. Always thrilled about scenery, read art magazines surreptitiously—everybody shocked at marrying an art-person, but I discover to the amazement of all (including self and husband) that it is most absorbing interest yet, and just the thing I seem able to do.

The interests given here may be grouped roughly under several headings, the largest of which is unquestionably the esthetic.

Esthetic

1. Flowers (age 3)
2. Poems (age 8)
3. Stories (age 7-10, 14-20)
4. Plays (10-20)
5. Costume and stage designing
6. Dolls
7. Esthetic dancing (college)
8. Episcopalian religion
9. Clothes
10. Household decoration
11. Music (critical side)
12. Poetry (critical side)
13. Novels (creative side)
14. Painting Christmas cards
15. Mounting photographs

Scientific

1. History
2. Geography
3. Greek
4. Archæology
5. Psychology
6. Anthropology

Remedial

1. Religious discussion
2. Y.W.C.A.
3. Missionary
4. Playgrounds (16-20)
5. Social reconstruction
6. Guild socialism

Personalities

1. School teachers
2. Principal of high school
3. Old professor of psychology
4. William James
5. Young professor of psychology
6. Professor of anthropology
7. Young assistant pastor
8. Bertrand Russell
9. Children

Aversions

1. Organized games
2. Gymnasium work
3. Mathematics (high school)
4. Science (high school)
5. Experimental psychology laboratory
6. Economics
7. Sociology

This is a very rich interest life, although, obviously, certain phases are entirely ignored. At the beginning of the narrative the subject is shown engrossed in esthetic interests. She is following these interests today and has been for the last eight years. Surely no one would have felt justified in predicting this future from the early evidences of her interests. In fact, we are coming to see that such guidance, if not unimportant, is one of the least important of the issues related to interests.

In the case of this woman, the childhood period is confined to a variety of creative expressions, fostered by her parents. In later days her urge to create has been discouraged by her teachers, while her final development into a critic of Renaissance art is apparently a very happy harmonizing of the esthetic and critical interests. The clear romantic element in this his-

tory appears satisfied by the period chosen for investigation, the fifteenth century in Italy; this would seem likewise to be the element back of the anthropology, archæology, geography, and travel interests. Her present work involves frequent trips to other countries.

The influence of persons upon immediate interests is clearly brought out here. The parents foster the early productions; high school stories concern idealized teachers. The later creative urge suffers because of discouragement by teachers. Psychology is chosen because of a fascinating lecture on the principles, it is maintained by affection for the old professor and by love for a young instructor. Church is joined because it is fashionable for all the girls to be in love with the assistant pastor. Social reconstruction interests grow out of the family circle and the period in which she matured. Housework interests grow entirely out of matrimony. Art interests on critical lines grow directly out of fascination attached to husband's work and the desire to assist him.

A Practical Moral. Let us take note here of a practical moral in the adjustment problems of the individual. The enormous specificity of interests is little less than astonishing. They develop in diverse and unique channels. Any estimation of the interests of an individual which does not delve deeper than a superficial expression by the subject, such as that which is included in the usual psychological or personnel examination today, is doing little more than is the child who tries to collect all the pebbles on the beach and take them home with him. Interests are like the pebbles on the beach in numbers and variety. The psychological examination of interests for the purposes of human adjustment is equal in difficulty, equal in time consumption, and equal in importance to the examination of abilities.

The History of Interest in Education and Industry. Both education and industry today look upon interests as an important psychological factor, by which an individual may be guided into a better adjustment. But this realization has taken place in industry within the last thirty years and in education within the last fifty. A historical sketch of interest

as a psychological factor in education and industry will be found in Appendix I.

THE PSYCHOLOGICAL NATURE OF INTERESTS. With the advent of measurement human interests have lost some of the mystery with which education and industry, abetted by a philosophical psychology, had surrounded them. A definition of interests some twenty-five years ago left the average man, who was familiar with the expressions of interest, quite bewildered. Today interests are more clearly defined by their measurement. They are named from the objects and activities, the psychological stimuli, which engage the attention of the individual.[3]

Psychology has used this concept in the measurement of interests, whether their investigation is by means of subjective methods or objective methods. But the method of study determines their designation as subjective or objective interests. Introspective psychology has extensively investigated the nature of subjective interests. This historical background is reviewed in Appendix II.

Subjective interests are of two kinds, which are determined by the two feelings of pleasantness and unpleasantness that accompany the interest experiences. In a measurement sense, subjective interests are likes, which are estimated experiences characterized by feelings of pleasantness, and aversions are dislikes, which are estimated experiences characterized by feelings of unpleasantness. Indifferent experiences mark off these two

[3] For this designation of interests as stimulating objects and activities in the individual's environment there is precedent from the measurement of abilities. The measurement of abilities consists in the measurement of ability expressions. The abilities receive their name, as do the interests, from the stimulating objects and activities. Interests are the objects and activities that stimulate pleasant feeling in the individual. Aversions are those which stimulate in him unpleasant feeling. Interests and aversions, then, are material quantities. These objects toward which the individual reacts are: property, people, stocks and bonds, capital in the form of principal and interest—all such material quantities considered by the science of economics. In addition to these material quantities, there is the capacity for consumption and for purchase. Other things not usually recognized as interest objects are ideas, copyrighted or patented or secretly treasured from the world. The objects of interest for the draftsman are not only his drawing board and his tools, but also his technique; for the teacher, not only his books, his pupils, and his experimental apparatus, but also his pedagogy and his prestige. These are also the objects of ability expression, and these objects are spoken of as abilities. But the manipulation of them is with pleasant feeling, unpleasant feeling, or no feeling whatsoever. In this sense, they are interests and aversions when they stimulate feeling experience.

feeling experiences which are present in varying degrees under stimulation from the objects and activities of the environment.

Objective interests are reactions. If one gazes intently at automobiles in a showroom, or parked along the street, we have an interest expression which is objectively observable. On the other hand, to estimate that one likes automobiles is a subjective interest. As with subjective interests, there are two kinds of objective interests, which are determined by the two movements toward and away from the stimulus. In a measurement sense objective interests are positive reactions and objective aversions are negative reactions to stimulating objects and activities in the environment. Indifferent reactions are evident in the absence of motor attention. There are varying intensities of objective interests as with subjective interests.

Both subjective and objective interests may be viewed as acceptance-rejection activity. An acceptance-rejection theory of interests is discussed in a later chapter as the most acceptable definition of the interest activities. These acceptances and rejections are observed in the behavior of the individual and in his estimates of pleasure and displeasure when stimulated by an interest situation.[4]

Some Results of Measurement. Measurement has done more than clear up the theoretical concept of the nature of interests. The measurement of interests fills an important place in individual psychology as it is applied, particularly in education and industry.

The measurement of interests is not more than 10 years old (1920). But before that time the child study movement had been founded upon interest concepts. An upheaval in scientific management was caused by recognition of the importance of this factor in the management of men. Guidance used in-

[4] The use of terms in the field of interest is very confusing. Measurement is giving us the definitions which we must follow. In the same way, the measurement of abilities has defined the terms in that field. In scientific usage the plural nouns are preferred. We speak of interests and aversions, which are the objects and activities of stimulation. There are few unitary stimuli which can be spoken of in the singular as an interest or as an aversion. Sometimes an occupation or a social event is spoken of in the singular as an interest. But generally the plural noun is used. Any stimulating situation is made up of numerous specific interests or aversions. Usage has established a new adjective, referring to an interest or interests, and spelled the same as the singular noun. The phrases, interest experience, interest inventory, interest interview, interest history, and so on, are frequently seen. Aversion is sometimes used in this manner as an adjective. This terminology is followed throughout the book.

terests as its starting point and education based its instruction upon the development of interests.

More definite results, however, have been achieved through the measurement of interests. Early conceptions accepted interests as having a high degree of permanence, so great that future interests were thought to be predictable from present ones. This statement of the development of interests has suffered from overemphasis. There exists a considerable oscillation of interests in mental life. Development is not always in relation to the same objects and activities of one's environment. The change factor is as important as the permanence factor in the development of interests. In so far as specific future interests are concerned, prediction over a period of longer than a year is without warrant. Old theories are replaced by new ones. The important thing is that this change allows for a well-rounded development of an interesting life.

Another early conception related interests to abilities or efficiency and looked for a prediction of abilities or achievement by an analysis of the individual's interests. For a time the best clinical practice aimed to secure a true statement of interests as the best guide for an adjusted personality. It seemed that interests must be a factor in efficiency and success, and a great deal of research has been devoted to this problem which does not as yet appear to be solved. Interests are and must be separate from abilities in the measurement sense, if they are not the same psychologically. Results of research show them to be fairly unrelated, even more so than measures in two fields of abilities such as the abstract and mechanical. But the problem of the influence of interests upon success, over a long period of time in particular, still awaits solution. High morale in a field of activity necessitates interests in this field. Perhaps more important in morale is motivation, the driving factor of the interest stimulus. But the individual satisfaction of interests would seem also to be important in achievement and success. Research does not find it so over a short period of time. We must await evidence of its effect over a long period of time.

Practical Uses of Measurement in Human Adjustment. A large number of tests of interests already have been

put on the market. Measurement of the pleasant and unpleasant feelings, which are called here the subjective interests, has been made largely by means of the interest inventory. This is a standardized form of the questionnaire. The interest inventory is a list of interest situations to which one responds by circling those things which he likes or dislikes. These have been scored for group interests. Scoring keys are now available for many of the occupational groups and curriculum units in education. There is the possibility of similar scoring keys for racial and national groups.

Tests of objective interests, or the reactions of the individual, make use of a variety of techniques. Those found to be most useful are the free association method and the information test. There are several of these tests available for practical purposes. It is not clear, however, that the measures of subjective interests and of objective interests are measures of the same thing.

Looking for the high spots of this research in the measurement of interests, which has lasted little over 10 years, but has engaged the attention of scores of investigators interested in its theoretical significance as well as its clinical application, it is quite clear that interests stand out as a separate unit of psychological activity distinct from other units such as abilities, emotion and motivation. This much has been accomplished.

If people show very great differences in their abilities they show even as great differences in their interests. A child grows up. He develops attitudes towards this and that, towards religion, politics, authority and what not. He grows up into a conservative, a radical, a doctor, a plumber, an atheist, a methodist, a cosmopolitan, and so on. The main difference between him and other people is not necessarily a difference in abilities, but more often lies in another important aspect of human reaction; it is a difference in interests.

Interest measurement is concerned with interest adjustment, with the increase in pleasure and happiness of the individual. Interest measurement offers a measure of pleasurable associations in social life. It is upon this foundation that interest measurement will develop in the future.

CHAPTER II

ESTIMATING SUBJECTIVE INTERESTS

THE subjective interests and aversions, the likes and dislikes of the individual are an important part of his mental life. Personnel workers have regarded these interests and aversions as closely bound up with the individual's vocational or educational adjustment, possibly as cause and effect or as mutually dependent. In the psychological clinic, where the attempt is made to clear up the problems of the child or the adult, an adjustment is often attained by the individual through interest in some task which he can successfully perform. Personnel workers as well as clinicians depend upon a knowledge of the interests and aversions, upon a knowledge of the individual's feeling experience, in order to stimulate a better adjustment to the job, to people, or to other situations. If a knowledge of the individual's feeling experience could be accurately gained it should be of tremendous assistance in guiding the individual into more efficient and satisfying channels of activity.

INVESTIGATING THE INTERESTS AND AVERSIONS. Most investigations of interests and aversions have been studies of the estimates by the individual of his feeling. The worker, the boy or girl, is asked to estimate how he feels toward an occupation or a course of study. And if he says he is interested, this information has been considered of value in predicting what he will do best in the future. In this way, it has been thought that some understanding is gained of the individual's interests.

The method has been long in use. A belief in it has been gradually built up. But as most frequently used, it is not well-defined and it is subject to grave errors. The individual is asked to estimate his feeling experience toward a large variety of objects and activities. Many of these objects and activities are well known to him; many more are little known

or entirely unknown. They may be occupations, courses of study, people, and so on. The person is asked to imagine himself in the situation of having to deal with them and to state whether he likes or dislikes them. Then, these statements of interests and aversions are used for purposes of vocational and educational guidance.

THE VALIDITY[1] OF THE INTEREST ESTIMATES. Anyone who has been in a position where he must select employees or offer guidance to those seeking an education or a job has found it necessary to come to some decision about the use of these estimates of interests made by the individual. The worker in industry or the student in school says, "I like" or "I dislike" this or that. How valuable is this expression of interests? Is this estimate the individual's usual feeling attitude which he now states so casually, or is it a passing attitude which may be quite different on other occasions? Probably every educator and personnel worker has asked himself this question: Is the interest estimate a valid expression of how the individual feels in relation to certain stimulating situations?

We know that this feeling attitude toward a job is dependent upon many and varied factors—boss, tools, health, friendships, prestige, and so on. The feeling toward one of these factors may dominate the job interests at that moment. An offhand unkind word from the foreman may so color the worker's otherwise satisfactory attitude toward his job that he reports, at the moment, a high degree of dissatisfaction in his work. An hour later this estimate may be reversed. Feeling, as the experimental psychologist has found, is exceedingly unstable.

But personnel men and educational and vocational counselors use these estimates of the individual's interests, believing that the individual is intelligent enough to weigh the separate factors stimulating interest, and to generalize upon his feeling attitude. Some have taken them at their face value as the best criteria of guidance. Others have used them skeptically because they know of nothing better in the practical situation. And there are others who have discarded them absolutely from

[1] "The validity of any measuring instrument depends on the *fidelity* with which it measures whatever it purports to measure." (Garrett, H. E.: *Statistics in Psychology and Education*, New York: Longmans, Green, 1926, p. 266.)

the clinical picture as of no valid significance in understanding the individual. Some executives have made ability the sole criterion of life's success. These workers have limited their scientific conception of personality, just as the early "scientific manager" was wont to deal with both human and manufacturing materials by the same efficiency methods. Others among the more enlightened personnel men have recognized in the interests and aversions an important factor in individual and group activities and they are experimenting with measures of interests to make them more valid indications of the individual's satisfactions and dissatisfactions in his occupational tasks.

It is difficult to say just how representative of the true feeling situation are the interest estimates. There is little with which to compare them except estimates of the worker's interests by employers, or by teachers, parents, and friends. Kelley (*11*, 14-18)[2] secured teachers' ratings of "emotional interest" in school work for 233 high school pupils. The teachers ranked the pupils in groups of about fifty, starting with the highest, and with the lowest, and ranking toward the average. This left an average group which could not be ranked, about twenty-five per cent in most cases. The average of the correlations[3] between two teachers' ratings of the same pupils was only .31, which makes it seem doubtful that the teachers had the same conception of the nature of interests in making

[2] Figures in the parenthesis in italics refer to bibliographical references at the conclusion of each chapter. Page references are occasionally recorded in Roman type. Bibliographies include only books and articles in the field of interest measurement. Other references will be found in the footnotes. Selected readings in the bibliographies are starred.

[3] "*The correlation coefficient* . . . indicates the degree of relation between two variables. It varies from +1 to −1. When the relation is perfect and positive, the correlation coefficient is +1. When the relation is perfect but inverse, the correlation coefficient is −1. When there is no relation whatever between the two variables, the coefficient is zero. Other values of the coefficient indicate intermediate degrees of relation." (Thurstone, L. L.: *The Fundamentals of Statistics*, New York: Macmillan, 1925, p. 205.) "A coefficient of correlation, then, may be thought of as the decimal fraction which tells what proportion of the causes affecting the magnitudes of the two variables are common to both variables." (Otis, A. S.: *Statistical Method in Educational Measurement*, Yonkers: World Book, 1925, p. 185.) "A variable is any quantity which can have numerical values. . . . The scores in intelligence tests constitute a variable. We may consider as a variable the scores made by the different persons in a group." (Thurstone, op. cit., p. 4.) Correlation coefficients given in the text without a sign are positive.

these ratings. But similar correlations for other traits were no higher. The correlations between the rankings of two teachers for intellectual ability was .28, for conscientiousness, .38, and for oral expression, .29. Kelley gives reliability coefficients [4] for the ratings of the four traits as follows: Intellectual ability, .49; conscientiousness, .61; emotional interest, .51; oral expression, .53, all of which are low reliability coefficients. However, the estimates of interest compare favorably with the estimates of ability and appear to be as valid and reliable as do the estimates of other traits.

VALIDITY OF ABILITY ESTIMATES AS AN ANALOGOUS PROBLEM. It is possible, it would seem, to secure some indication of the validity or truth of the interest estimate by considering the validity of the ability estimate. Abilities have been estimated, and then measured. A comparison of the estimates of abilities with the true ability situation offers a suggestive analogy to a comparison of the estimates of interests with the true interest situation.

Filter [5] described six new intellectual tasks to a group of one hundred and fifty-four college students and two new tasks of skill to forty-eight college students for their estimation of what they could do. The tasks were then performed. Correlation coefficients, by the Spearman Rank Difference Method, between estimates of abilities and measured abilities were found as follows: —.14, —.10, .05, .13, .14, .24, .32, .51. With an average coefficient of .135 (median [6]), or of .14 (mean [7]), the relationship [8] between measured abili-

[4] "The reliability of a test (or any other measuring instrument) is determined by the *consistency* with which it measures the capacity of those taking it." (Garrett, H. E.: *Statistics in Psychology and Education*, New York: Longmans, Green, 1926, p. 268.)

[5] Filter, Raymond: "Estimates of Amount of Work One Can Do," *J. of App. Psychol.*, 1927, XI, 58-67.

[6] The *median* or mid-score is "the point above which and below which are fifty per cent of the measures." (Garrett, H. E.: *Statistics in Psychology and Education*, New York: Longmans, Green, 1926, p. 11.)

[7] "The *mean* is the sum of the scores divided by the number of scores." (Otis, A. S.: *Statistical Method in Educational Measurement*, Yonkers: World Book, 1925, p. 19.)

[8] "Strictly speaking, the term 'high correlation' should be applied only to coefficients which are .95 or above. . . . Very seldom do correlations between tests run above .70 or .75; and hence it is probably justifiable, in view of the limitations mentioned, to regard such coefficients as high. There seems to be

ties and estimated abilities is shown to be positive but negligible. From this evidence it appears that there is little likelihood of accurately predicting abilities from estimated abilities. In fact, such prediction is hardly better than a chance guess.

This investigation is of new tasks, in which the individual had had little or no opportunity to become informed of his abilities. These results might be considered by analogy to be representative of the situation in the field of interests when the individual knows little or nothing of the objects and activities in which he is estimating his interests. The more usual situation in personnel work is when the individual has some understanding of his interests.

Such a situation in the field of educational abilities has been investigated (7). A group of one hundred and four college students was asked to rank their elementary school, high school, and college subjects according to their estimation of their abilities in these subjects. They were not to be concerned with remembering the grades they got, but were to make these estimates their best judgment of their abilities. These rankings were compared with the rankings according to the school grades these individuals had received. Another group of eighty-nine college students was studied likewise for high school abilities. Here you have a situation where the estimator knows something about his abilities. The criterion [9] of abilities is what he had done in the past. A better criterion would have been had by measuring the student's abilities after securing the estimates. Correlation coefficients were found as follows: .28, .47, .52, .54. With an average correlation of .45 (mean), or of .50 (median), there is indicated a substantial

fairly general agreement among workers with tests that an
r from .00 to ± .20 denotes indifferent or negligible relation.
r from ± .20 to ± .40 denotes low correlation: present but slight.
r from ± .40 to ± .70 denotes substantial or marked relationship.
r from ± .70 to ±1.00 denotes high relation."
Garrett, H. E.: *Statistics in Psychology and Education.* New York: Longmans, Green, 1926, p. 298.

[9] A *criterion* is a measure by which the value of another unaccepted measure is estimated or judged. "A criterion of accomplishment is something which may be used as a measuring stick for gaging a worker's relative success or failure." (Bingham and Freyd: *Procedures in Employment Psychology,* New York: McGraw-Hill, 1926, p. 30.)

of vocational and educational guidance, have endeavored to improve the validity of the interest estimates.

THE INTEREST INVENTORY FOR EDUCATIONAL AND VOCATIONAL ORIENTATION. The interest questionnaire or inventory was first introduced as a device to stimulate the individual to think about his interests, and to bring before him the problems he should think about. Lists of occupations and educational courses have been made for this purpose. The census classification is widely used. A book by the author, *Vocational Self-Guidance* (5), guides the individual through a process of vocational and educational orientation in which measurement plays a part. Included in a questionnaire for the study of personality by Floyd Allport [10] is the following list of questions upon interests:

IV. AMBITIONS, INTERESTS, AND VOCATIONAL TENDENCIES

48. (a) Have you at present a definite and practicable ambition or goal for your life's work? If so, what is it? (b) What specific things are you doing in order to realize this ambition?
49. Is your ambition usually conceived in terms of an Ideal Person you would like to become, or of acts which you would like to be performing, or of power or prestige which you would like to possess?
50. Have you succeeded in making this purpose serve automatically as a drive behind all your daily work, or is it merely a day dream of the future? That is, does your ambition lead into action or into mere imagination?
51. (a) How frequently do you change your mind about what you intend to become or to accomplish? (b) What are the reasons for these changes of mind?
52. Is your ambition in keeping with your ability and other traits of personality?
53. Does your zeal for accomplishment often spur you to strenuous mental or physical exertion and increase your endurance and resistance to fatigue?
54. Have you any hobbies or special interests? Name them.
55. (a) What is the origin of your various interests or ambitions? (Trace these origins as far back as you can.) (b) To what degree of successful achievement are they likely to lead?
56. Are your minor interests and activities conducive or detrimental to the success of your major ambition or vocational work?

[10] "A Systematic Questionnaire for the Study of Personality," 8 pp., published by C. H. Stoelting Co., Chicago, Ill.

> That is, are all your drives, habits, and interests organized for the attainment of some final purpose? Is there harmony or conflict in your motivation?

These questions aim to stimulate thought upon interests at the intellectual level of the college student.

The orientation method has been developed by Lehman (*15*) in connection with his "Vocational Attitude Quiz."[11] Two hundred occupational items are listed as "Part A," with directions as follows:

> What occupations would you be willing to follow as your life work? Read through the following list of trades, professions and other occupations, and as you read through the list, draw a circle with your pencil around each number that stands in front of every occupation that you think you would be willing to engage in as your life work.
>
> 1 Dentist
> 37 Mail Carrier or Postmaster
> 81 Civil Engineer
> 124 Stenographer or Typist
> 161 Marble or Granite Worker
> 200 Housewife

"Part B" allows for any additions to the list already circled. "Part C" narrows down the occupational preference to "the three occupations that you think you would like best." "Part D" narrows down the choice to the "one occupation you think you will most likely follow." Parts E to G call for choices based upon monetary importance, social prestige and ease of work. The narrowing down of choice, after the informative process of "Part A," is considered particularly important in increasing the validity of the estimate.

The most widely used interest inventory, for purposes of orientation, was prepared by Miner (*17*) in 1918. Miner's blank was first tried out upon approximately 10,000 high school children with results which caused him to conclude that the method was of value in improving the validity of the interest estimates. Approximately 28,000 copies of the blank have been used by vocational counselors, school teachers in high school, arts college, agricultural college, teachers' college, etc., Y.M.C.A. secretaries, public and private employment offices, industrial and commercial establishments, veter-

[11] Lehman's "Vocational Attitude Quiz, for Grades Three and Above" is a four-page folder published by the School of Education, University of Kansas, Lawrence, Kansas.

ans' bureau, research organizations, and trade school (*18*). Also, the blank has formed the basis for numerous self-analysis blanks, among them many of those used by the Y.M.C.A.

Miner's interest inventory was published in 1922 in revised edition, for general use, under title of "Analysis of Work Interests." [12] "The purpose of this blank is to help to discover special interests and abilities by suggesting how to observe one's own likes and dislikes" (*17*). Various orientation procedures are used. After calling for personal, educational and vocational information the subject is directed to indicate two groups of school subjects, such as English (rhetoric, literature, expressional English), which have interested him most, after which he is directed to state for these groups the major cause of these interests, as either *"teacher"* or *"subjects."* A second orientation section contrasts working conditions, such as indoor and outdoor work, and directs the subject to "check that one in the pair under which you believe you would do the better work." A third section is a list of 38 desirable traits, such as accuracy and quickness, and requests the subject to choose seven in which he is strongest. This choice of strongest traits is narrowed down to two, after which the subject is asked to select two in which he is weakest. In another section the subject is asked to think about hobbies and games played outside of school in relation to his choice of a life work. Another section deals with general types of activities; another with various kinds of activities, such as operating engines, scientific work, artistic creation. The practical vocational question is then raised of the subject's possibilities of starting in his chosen field upon leaving school. The final section of the inventory relates to definite vocational choice, in which the subject is asked to tell the vocational counselor in writing:

(1) What sort of life work you now think that you would prefer to follow.

(2) All the reasons which you have discovered from filling out this blank, or from any other sources that makes you prefer this work for yourself.

[12] Miner's "Analysis of Work Interests," is a four-page folder distributed by C. H. Stoelting Company, Chicago, Illinois.

KINDS OF INTEREST INVENTORIES. There are two ways of looking at the factors which make up the environment in which we live. We are stimulated by them or we are reacting towards them. An inventory may be made as a list of the stimulating objects and ideas, or it may be made as a list of the human reactions. These latter are called activities. An inventory of stimuli may be thought of as a structural inventory and an inventory of activities may be thought of as a functional inventory. A list of occupations would seem to some individuals to be a list of tools and so on. To others an occupation would appear as a group of activities. Whether the occupation is a group of objects or a group of activities would depend upon the point of view of the person answering the inventory. There are, however, groups of common activities in the various occupations. The occupations overlap functionally. It is in recognition of the fact that there are common functions or activities running throughout a large field of occupations that investigators have endeavored to bring these activities together into an activity inventory.

THE OBJECT INVENTORY. Only a word need be said about the object inventory. It has not formed a distinct approach to the investigation of interests. Many of the earlier inventories were formed of what evidently were meant to be stimulating objects. Later inventories used more items meant to imply activity. Most frequently the structural and functional attack have been combined. It is because the activity inventory has formed a definite line of investigation that the distinction is necessary.

THE ACTIVITY INVENTORY. Two methods have been used in building the activity inventory. One, the older, aimed to classify activities, for example, occupational activities, into groups of common activities and then to assemble these groups into more inclusive categories. For example, all occupations may be classified functionally into outdoor and indoor work, and again into abstract and concrete work. These major activity distinctions are gathered together into an inventory and the individual is asked to estimate his interests in relation to these activities. The individual is asked to review the occupations which he knows and to decide whether he likes or

dislikes a particular function as it is found in these occupations.

Schneider (*22*) published in 1913 a list of ambivalent occupational functions or opposing characteristic types of work resulting from the guidance of about five hundred engineering cooperative students (Table I). These were activities which he expected to find in the talents or abilities of the workers.

TABLE I. SCHNEIDER'S LIST OF OCCUPATIONAL ACTIVITIES

Physical strength	—	Physical weakness
Mental	—	Manual
Settled	—	Roving
Indoor	—	Outdoor
Directive	—	Dependent
Original (creative)	—	Imitative
Small scope	—	Large scope
Adaptable	—	Self-centered
Deliberate	—	Impulsive
Music sense	—	Color sense
Manual accuracy	—	Manual inaccuracy
Mental accuracy (logic)	—	Mental inaccuracy
Concentration (mental focus)	—	Diffusion
Rapid mental coordination	—	Slow mental coordination
Dynamic	—	Static

This list of broad functions of the occupations, made by Schneider for the purpose of analyzing the worker's personality and fitting him into occupations requiring these functions, has formed the basis for many similar lists used to counsel the individual upon the general functions of the occupations.

Miner's Analysis of Work Interests includes three such classifications of activities. One of these divides all occupational activities into "Making useful things," "Producing artistic results," "Dealing with people," and "Thinking out problems." Another list of paired interests contrasts working conditions for the checking of opposites as follows:

( ) Skilled hand work
( ) Skilled heavy work

( ) Broad planning
( ) Attention to details

There are thirty-seven of these paired interest contrasts. The third list of activities in Miner's inventory includes such items as the following:

( ) Growing Plants, as in farming, gardening, greenhouses, etc.
( ) Operating Engines, as locomotives, automobiles, steam plants, etc.

There are twenty-two activities listed in this manner.

Miner's blank was prepared for the orientation of high school boys and girls in the study of their work interests. But parts of the blank have been found usable for measurement purposes. Miner (*19*) shows by an analysis of the thirty-seven paired interest contrasts that women taking secretarial courses can be separated from women taking economic courses with three out of four chances of correct selection; also, men studying machine construction can be separated from those studying electrical construction with two out of four chances of correct selection. These figures are the results from small groups.

Mills (*16*) describes a method of analysis of general activity interests in the personnel interviewing of college engineering students for the Western Electric Company. The method is that of stimulating the individual to make an estimate of interests in occupational activities after an explanation of the classification to be used. Mills uses a classification of technical occupations into ideas, men, things, and symbols; a classification of engineering courses into theory, manipulation, design, personnel operation, physical operation, costs, and artistic fields; a classification of interests into technical and supervisory character; and a classification of ambitions into financial, honor, and workmanship. Through his interviewing Mills has worked out in a practical, common-sense manner the relative importance of these interest generalizations to five types of engineering work.

Criticism of This Kind of Activity Inventory. This kind of activity analysis has formed the basis for the work of many counselors in starting the process of vocational and educational guidance. Parsons' method (*21*) in Boston included such an analysis. But it has in it two possibilities of

error. An estimate can be no better than the knowledge upon which it is based. This criticism applies to the use of all inventories and may be called the *information error.*

The value of placing before the individual an inventory of broad occupational activities, such as the list of Schneider, for the individual to decide if he likes or dislikes certain general occupational functions, depends upon the information the individual has of the occupations in which these functions or activities exist. He decides whether he likes or dislikes the activity as it is found in the different occupations about which he is informed. The fewer occupations he knows in detail the less valid are his estimates of activity interests likely to be.

The second error has to do with the size of the generalization to be made in estimating one's interests. The larger the generalization to be made, the greater the amount of information upon which it is dependent and the greater the likelihood of error. This might be called the *generalization error.* In estimating his liking for the activity, climbing trees, one only has to have information of a few occupations, such as apple picking, trimming trees, etc., and can estimate with accuracy, if he has had experience in these occupations, whether he likes or dislikes this function. The generalization is limited. But to ask an individual to estimate if he likes or dislikes work with ideas, promotion work, operating machines, and so on, involves wide generalizations. One uses ideas in a vast number of occupations, and promotion work is found throughout much occupational endeavor.

These two errors were studied in the use of a general activity inventory similar to that of Mills (*6*). The occupations were classified into two major activity groups with two subdivisions:

The *Humanics* or work with people, in which there is the
1. Concrete work directly with people, as in buying and personal selling, and
2. Abstract work indirectly with people, as in advertising and journalism;

The *Mechanics* or work with things, in which there is the
1. Concrete work directly with things, as in farming and the industrial processes, and
2. Abstract work indirectly with things, as in designing and accounting.

This classification of occupational functions was presented verbally to two hundred vocational counsel subjects and described in an inventory to five hundred and thirteen employment applicants. Ninety-one per cent of the counsel subjects were stimulated by a brief explanation of the classification to generalize upon their occupational interests. When, however, a detailed discussion of many representative occupations of these types of work was entered into, it brought about an "informed ignorance" that made any such generalization seem impossible. Also, from a study of the case histories it appeared that the generalizations that were made were most superficial. Abilities and interests were often confused and the preferences were usually stated in a superficial manner, "Oh, I like to deal with people. . . . I like to have the finished product in my hand. . . . I want to be out in the open. . . . I have a mechanical bent, etc." There appeared to be no detailed understanding of the generalization made. The meaning of the "type of work" seems to have been limited to an understanding of a few specific occupations or a particular task described by the counselor in making clear the working functions.

With the group asked to fill out an inventory, and without the vocational counselor present to stimulate an interest generalization, only four hundred and forty of the five hundred and thirteen individuals answered. Furthermore, two hundred and nine of the four hundred and forty individuals stated that they preferred work both in the "mechanics" and "humanics" groups. Thus of the five hundred and thirteen individuals, it might be interpreted that fifty-three per cent were unable to generalize upon these wide activity interests.

Improving the Activity Inventory. While subjective generalizations will always be present in the inventory, it is thought possible by reducing the scope of the generalization to increase the validity of the interest estimate. Two independent investigations have been started with this theory in mind, one by Brainard at the Kansas State Agricultural College and the other by Hartson and Brentlinger at Oberlin College. Both investigations have been based upon the theory of sampling activities, our reactions to the factors which made up our en-

vironment, rather than of classifying activities into a few all-inclusive groups, or types of work, as had been the plan of the previous investigators.

BRAINARD'S INVENTORIES OF EDUCATIONAL AND VOCATIONAL ACTIVITIES. Brainard began work in 1923 upon detailed activity inventories of interests. His aim was to inventory feeling activities by securing estimates of the degrees of feeling accompanying acts repeated many times. He planned to sample the specific activities of college students and to represent them in the inventory with such items as writing poetry, reading newspapers, speaking in public, hiking for exercise, solving equations in physics or chemistry, doing carpentry work, entertaining guests, setting up machinery. The activities are made as specific as the condition of the testing will allow.

The first inventory made by Brainard, with this purpose of typifying student activities, was for the field of engineering (*1*). The activities of engineers were selected with two criteria in mind: (a) each activity must be something that the engineering student has done or with which he is familiar, and (b) it must be much the same sort of thing he will have to do as an engineer. The training of an engineer was analyzed into its major activities and ten specific activities were included in the inventory for each of these major activities, which follow: mathematics, English, science, fine arts, shop work, social, drawing, outside affairs, mechanical curiosity, and physical activity. Ten of the items of the inventory, which totaled 100, follow, one for each of the major activity fields:

1. Doing arithmetic problems
2. Writing poetry
3. Setting up laboratory apparatus
4. Playing a musical instrument
5. Making articles of furniture
6. Social dancing
7. Freehand lettering (printing)
8. Reading newspaper
9. Visiting electric power plant
10. Running foot races

The individual is asked to estimate his like or dislike of these activities. A revision of this inventory was made for more general collegiate use.

A trial of these early forms of the activity inventory was made by Brainard with several groups of college students at the Kansas State Normal School (*1*). Based upon results from two groups of 300 and 250 engineering students he concludes that, "There is a reasonable assurance . . . that a man who scores low in interest will not succeed, especially if his mental rating is also low, but a high interest may help out a low mental score to some extent" (*1*). Among 105 engineering students who dropped out of college, the interests of 43 were above the median of the total group and the interests of 62 were below the median of the total group.

General activity inventories have been prepared by Brainard for use with high school students, one for boys and one for girls. As with college students the training of high school boys and girls was analyzed and each of 15 major activities was represented in the inventory by ten typically specific activities. Such activities as climbing on trees, driving nails, matching pieces of wood, feeding chickens, making out a schedule of the day's work, were included in the boys' inventory, and such activities as caring for babies, being school teachers, canning, writing about experiences, matching colors, keeping dresser drawers neat, were included in the girls' inventory.

These inventories for boys and girls have been administered to various groups of high school pupils, from which there comes the suggestion of value for vocational guidance purposes. Homogeneity of interests was suggested when the girls' form was administered to 94 elementary school teachers.

A revision of the boys' and girls' inventories has now been made for general use among high school pupils and entrants to college. This inventory, called the "Specific Interest Test," [18] is based upon the analysis of interests into the twenty major activity groups which follow:

A. Physical—Likes to do work involving bodily exertion.
B. Mechanical—Likes to construct or repair machinery.

[18] The various revisions of Brainard's Activity Inventory are on file in the Department of Psychology, New York University, New York City. There are the following forms: Form A, for engineers; Form D, a revision of Form A, for general college use; Form B, for high school boys; Form C, for high school girls; Form B, a revision of Forms B and C, for high school pupils and college entrants. Form B (revised) is distributed by P. P. Brainard, University of Michigan, Ann Arbor, Michigan.

C. Outdoor—Enjoys outdoor life.
D. Vocal Expression—Likes to talk to people, to argue or explain.
E. Drawing—Has an interest in accurate reproduction of objects.
F. Leadership—Prefers to lead rather than follow.
G. Social—Enjoys group activities, prefers not to work alone.
H. Order—Wants to have materials arranged systematically.
I. Literary—Has desire to express ideas in written articles.
J. Mathematics—Enjoys working with figures and symbols.
K. Esthetic—Is appreciative of beauty and art.
L. Scientific—Interested in physical phenomena.
M. Fine Manual—Likes to use fingers in making adjustments.
N. Commercial—Likes to deal with people in business.
O. Skilled Manual—Likes to use hands.
P. Music—Enjoys all forms of musical expression and appreciation.
Q. Study—Likes to dig into a subject and know all about it.
R. Experiment—Enjoys trying things and watching results.
S. Observation—Is interested in the way people or things act.
T. Creative Imagination—Pictures everything vividly in the mind.

In the inventory each activity group is represented by five typically specific activities. Those which follow are chosen to represent the mechanical field.

How do you like—

6. To make wagons, toy airplanes or other mechanical devices?
7. To set up electric trains, "Mechano," "Erectors" or mechanical apparatus?
8. To take apart an electric iron, auto part, bicycle, etc., repair it, and put it together again?
9. To read articles on mechanical construction of airplanes, radio sets, etc., and figure out the drawings?
10. To visit machine shops, electric plants, factories, etc., and ask questions about how the machinery works?

A separate score is possible for each main group activity to indicate interest trends. This inventory has been installed as a part of the "Freshman Test" at the Kansas State Agricultural College. Brainard reports that valuable suggestions of common interests among various academic groups have already come from its use.

BRAINARD'S SCORING PLAN. An important step in making an interest inventory is the development of a scoring method whereby the results of the individual's estimates of like, dislike, or indifference to these items of the inventory may be

summarized into a score. The individual answering the inventory may generalize upon the results of his markings. This is really what he does in reading over an inventory of interest items. Thus the inventory is an orientation device which systematizes his feeling attitude. What is wanted, however, is an objective method of scoring the results of the detailed estimates of interests and aversions.

Brainard, it will be recalled, started with certain groups of interest activities: physical, manual, conversation, and so on, securing ratings of specific activities for each of these groups. He assembled the ratings of likes, dislikes, and indifferences into a score for each of the major activity groups. Comparisons for the different groups are secured, from which a profile [14] of group interests may be drawn.

A scale of seven degrees was used in asking the individual to estimate his feelings towards each specific activity in a group, as follows:

1	2	3	4	5	6	7
Very Unpleasant	Quite Unpleasant	Slightly Unpleasant	Neutral	Slightly Enjoyable	Quite Enjoyable	Very Enjoyable

From the numerical value of the degree that is checked by the individual for each activity of a group, Brainard made up a score for this group. Low scores would indicate numerous aversions and high scores numerous interests. A neutral score for any activity would be 4. The relative values of all scores are arbitrarily fixed and have not been tested with criteria.

This method of scoring, which was introduced by Brainard, looks promising on the face of it, though seven different degrees in the intensity of our feeling experience would seem difficult to isolate. Many other investigators in this field have fallen into this error. It is not difficult usually to say whether or not the experience is pleasant or unpleasant. It is more difficult to say that it is indifferent. And it is vastly more difficult to estimate degrees of feeling. It is possible that five

[14] The *profile* presents graphically an individual's scores in various measures.

degrees of feeling can be estimated with accuracy by many, but with average training in the estimation of feeling it is probable that three degrees are all that can be used with valid results.

"THE OBERLIN VOCATIONAL INTEREST INQUIRY." Hartson commenced work at Oberlin College in 1925 upon the development of an activity inventory to study the interests of college students. His purpose was to make such an inventory useful in vocational and educational guidance at the college level and the early forms of the inventory were planned to assist the counselor in the interview.

The 1927 edition of the "Oberlin Vocational Interest Inquiry," which is the third in the series of development, aims in so far as possible to be all-inclusive of professional activities. Occupational activities are grouped in this inventory for the checking of one item in each group according to the following plan:

Group 4. The diagnosis of ( ) Human disease; ( ) Engine trouble; ( ) Plant disease; ( ) Statistical error; ( ) Labor disputes; ( ) Interests and Abilities.

Before these detailed vocational activities were listed, however, the occupations entered by college students graduating from Oberlin were analyzed from several points of view. These occupational activities were classified in terms of:

I. Purpose
II. Type of activity involved
III. Nature of social function involved
IV. Responsibility and authority involved
V. Freedom from conventional restrictions

The activity groups in the inventory were listed according to these five points of view. There are thirty-nine in all, which were included upon a summary sheet for the use of the interviewer. Specific occupational activities, six for each activity group, such as the one given above, made the students' inventory an activity interest analysis of very wide scope.

A 1928 edition of The Oberlin Vocational Interest Inquiry is a detailed extension of the first part of the 1927 edition.

Hartson and Brentlinger have narrowed down the analysis of occupational activities to one point of view, that of purpose. A change in the inventory is also made to include a greater number of specific activities. The major activities are shown in Table II.

TABLE II. MAJOR OCCUPATIONAL ACTIVITIES SELECTED ACCORDING TO PURPOSE (HARTSON)

1. Creative activities.
2. Research for facts which no one knows.
3. Investigation where the source of information is persons.
4. The diagnosis of difficulties, disorders, and troubles.
5. The compilation or organization of previously discovered facts; work involving the consultation of or search through books or other documents.
6. The oral or written presentation of reports, as distinguished from investigation and compilation of data.
7. Activity aimed at financial profit which involves the element of speculation.
8. Activities involving physical prowess or courage.
9. The formulation of policies and plans for their attainment.
10. The detailed planning of work, the general outline of which has been previously formulated.
11. Executive management which involves the selection and supervision of those who perform the detailed operations.
12. The solution of practical construction problems; work involving machines, tools or physical materials.
13. Routine activities performed as a matter of routine or according to specifications.
14. Passing judgment upon conduct, achievement, or product.
15. Arbitration of disputes or settling of disagreements.
16. The professional administration of advice.
17. Persuasion of others to a specific viewpoint; selling ideas or commodities or services.
18. Teaching or instruction.
19. The offer of service, aid or relief.
20. Professional entertainment.

There are three hundred and eighty specific activities scattered in the inventory to represent these twenty major activities. These are listed in paired comparisons in which two items of opposite function are compared for the checking of interest. If interested in the one at the left of these comparisons, a check is made in the left-hand parenthesis (No. 1); if inter-

ested in both comparisons, a check is made in the second parenthesis (No. E); if indifferent to either comparison, a check is made in the third parenthesis (No. I); if interested in the right comparison, a check is made in the right parenthesis (No. 4). A few of the items illustrate the method:

	1	E	I	4	
Distribute mail according to destination	( )	( )	( )	( )	Judge the efficiency of post office employees
Determine the policies of summer camps	( )	( )	( )	( )	Select the camp personnel
Judge stock at a fair	( )	( )	( )	( )	Give professional advice on stock raising
Unraveling an error in bookkeeping	( )	( )	( )	( )	Formulating a financial statement

A new form of this inventory is planned to reduce overlapping of functions in the twenty major activities and to eliminate items which do not show significant group differences.[15]

THE OBERLIN SCORING PLAN. There are 19 items in the 1928 edition representing each of the twenty major activities. The number of items, or halves of a paired comparison, which are checked as liked is the score used. Separate scores are computed for each of the 20 activities with a possible total of 19.

The inventory has been tried out upon about 500 seniors of the classes of 1928 and 1929 at Oberlin, 87 first year men in the law school, 100 Y.M.C.A. secretaries in Ohio and a small number of Divinity students at Wittenberg College. Often scores for one of the twenty occupational functions will total as high as 17. Outstanding differences in scores are found favoring one or more of the twenty major activities. No use has been made of the "E" (either) or "I" (indifferent) markings of interests.

THE ACTIVITY INVENTORY (SUMMARY). The activity in-

[15] "The Oberlin Vocational Interest Inquiry" is on file in the Department of Psychology, New York University, New York City. The 1927 edition (Form C) is an eight-page inventory and four-page summary sheet. The 1928 edition (Form D) is a four-page folder.

ventory might be thought of as a job-analysis of the occupations. In its development job-analysis technique is necessary. In the extended lists of specific activities the generalization error is removed to a high degree. But the information error will be present in so far as there is lack of information on the part of the individual regarding any particular item. The validity of the estimate will be in proportion to the knowledge of the individual making the estimate of interests in the activity under consideration.

At present there is a real need for investigation of the exact knowledge that people of various ages have of the occupations, their functional relations, their monetary, educational, and experience requirements, and so on. The situation is much the same as it was fifty years ago when the child study movement surveyed the content of the child's mind to find out what a child really had learned at certain ages. We need to know what is the occupational content of the adolescent's mind at different ages, to see what informational basis there is for a valid estimate of interests.

MEASUREMENT BY MEANS OF THE INTEREST INVENTORY. Our discussion thus far of the interest inventory has been largely from the point of view of orientation. In the use of the interest inventory later investigators aim to go farther than orientation. They aim not only to secure an estimate of like, dislike, or indifference to the items of the inventory, but to generalize these estimates into a score. Several of the investigators referred to in the previous pages have tackled the problem of a numerical score, and several have used some sort of score, but none have achieved a standardized measurement.

When the problem is faced of summarizing the results of an inventory into a score, the question is immediately raised: "A score of what?" The assumption has been made by a few investigators that there are differences between people in numbers of interests and that the inventory might be scored for differences in general interests in the same manner as an intelligence test is scored. Likewise an assumption can be made of the existences of differences between people in aversions. But the conception is theoretical and very little experimental work

has been done to develop a scoring technique of general interests.

Most investigators have worked with a different theory that there are common interests for different fields, particularly for occupational and professional groups. Instead of assembling the results into a score for interests in general, the purpose has been to assemble them into a score for interests in an occupation or field of activity. The question is asked: "How does this individual stand in his interests in relation to other individuals who are Jews, Orientals, mental workers, doctors, lawyers, successful college students, and so on?" In this, the assumption is made that there are common interests for these groups.

This is an assumption similar to that made by many social theorists, as for instance by Franklin H. Giddings in his explanation of social cohesion as caused by a "consciousness of kind" found throughout society. We have common feelings of kind. The attempt is made to distinguish group interests and aversions in the inventory and to make a scoring key of these common feelings which can be used in scoring the inventory to see if an individual has or does not have the interests and aversions of the group. A person's score in a professional group, or any other group, might be the number of his interests and aversions which are the group's interests and aversions, minus the number of his interests and aversions which are not the group's interests and aversions, or his score might be some other expression of a numerical summary of the results. The group method of scoring is used in all later developments of the interest inventory.

A Pioneer Study in Scoring for Group Interests. An interest questionnaire was scored for group interests in 1913 by Kelley, but there is little indication that this pioneer study influenced the work of the later investigators into group interests. There is but one reference to the study during the years between 1920 and 1930 when the standardization of interest inventories has taken place, and this was in 1930.

Kelley (*11*, 40-62) developed a battery of questions, some asking for estimates of interests and some requiring factual

information. The inventory used both inventory and testing methods. The average time to administer the battery, which was prepared for use with high school pupils, was 40 minutes. Kelley described it as follows:

> In order to insure such spontaneity and freedom of choice, an interest test was so devised as to cover impartially all the ordinary interests of a pupil. Because this test covers so broad a field it may be used equally well to measure a pupil's interest in lines other than mathematics, English, and history, which are the lines for which its significance has been evaluated in this study (*11*, 40-41).

The following will indicate the form of this early interest questionnaire which was the first to be tried out with the purpose of measurement of interests.[16]

A. *Magazines:*

1. Go through the accompanying list of magazines and put an *X* opposite those with which you are not familiar, that is, opposite those of which you have never looked through at least two numbers.

(Then follows a list of seventy magazines, such as,)

2. American Boy 22. Graphic 44. Munsey's

Go through the list again, marking the five that interest you most A, B, C, D, and E; A for the most interesting of all, B for the next most interesting, and so on. Do not spend much time in deciding *exactly* upon your prejudices.

2. Briefly tell why you particularly enjoy reading the magazine that you have marked A.

B. *Books:*

3. Name three books which you have read in the last two years that have interested you very much.

1. ..... 2. ..... 3. .....

C. *Sports:*

4. Suppose that you have an hour's leisure time, in what outdoor amusement would you prefer to spend it?

5. Suppose that you have an hour's leisure time, in what indoor amusement would you prefer to spend it?

6. Of the two amusements named in your answers to questions 4 and 5, which do you prefer?

D. *Amusements:*

7. If you had the opportunity, which one of the following would

[16] Kelley's interest questionnaire is given by him (*11*, 41-43) in complete form.

you attend, supposing each of them to be first class of its kind? Mark it A.

(Then follow 14 amusements, such as,)

2. Circus 8. Grand Opera 10. Band Concert

E. *Vocations:*

8. What occupation would you prefer as a life work? Which would you like next best?

F. *Vocabulary:*

9. In the following list of words mark with a 3 those you know the meaning of perfectly and could define as a dictionary does.

If you can explain in a general way the meaning of the word and would understand it when used in a sentence mark it with a 2.

If you cannot explain its meaning but are vaguely familiar with it, mark it with a 1.

If the word is entirely new to you and unknown, mark it with an 0.

In doing this, go through the list four times, the first time marking the 3's, the second time the 2's, the third time the 1's, and the last time the 0's.

(Then follows a list of 62 words, such as,)

4. creed	20. guillotine	41. Pythagorean proposition
12. I.W.W.	30. lever	55. giblets

G. *Factor of Accuracy:*

10. Tell what each of the following words means as well as you can.

(Then follow 13 words taken from the list of 62 given in question 9.)

Three scoring keys of educational group interests were prepared, one for high school English interests, one for high school history interests, and one for high school mathematics interests. These scoring keys are based upon judges' estimates. In preparing the scoring keys for "Magazines," each item was graded on a scale of 0 to 10 for significance in English and in history. The score for an item in English interests was the average of the judges' estimates of the significance of the magazine for English training. The score for an item in history interests was the average of the judges' estimates of the significance of the magazine for history training. The average correlation between judges' estimates was .86 and the reliability of the judges' estimates is computed as .96. The estimates of subjective interests were brought into the score

for the items rated "A", "B", "C", "D", "E" by multiplying the scores of those items by 10, 8, 6, 4, 2, respectively.[17]

The scoring keys for the other questions were prepared in a similar manner. In preparing the scoring keys for "Books" the judges graded a list of 300 book titles according to their significance in English and history. Here the average correlation between judges' estimates was .80 and the average reliability coefficient .90. The individual interest score in "Books" was the average score of the three books weighted 3, 2, 1 respectively.[18] The "Sports" listed by the pupils were graded by judges in a similar manner for their significance in English, history, and mathematics. The average correlation between judges' estimates here was .24 and a reliability coefficient between judges of .49 was computed. The individual score in "Sports" interests was the average of the three choices made by counting once each choice in questions 4, 5, and 6.[19] The list of 14 amusements was rated according to significance in English, history, and mathematics.[20] The average correlation

[17] The scoring key for magazine interests is illustrated by the following:

Items	*English Scoring Key*	*History Scoring Key*
1. All Stories	1	0
2. American Boy	2	1
5. Atlantic Monthly	10	4
22. Graphic	4	7

[18] Scores are given (*11*, 46-50) for the 300 books. The general scoring key, based upon the judges' estimates, follows:

Score	*English*	*History*
1	The best literature	Straight histories.
2	Excellent literature	Books that are mainly historical. Historical biographies, etc.
3	Good literature	Partly historical. Historical fiction.
4	Medium literature	Fiction or adventure with traces of historical material.
5	Poor	Adventure, etc., with no claim to any historical matter, but with lively action and plot.
6	Very poor—semi-trash	Non-historical fiction.
7	Pure trash	Books with neither plot nor historical background, e.g., Electricity for Beginners.

[19] Scoring keys for English, history, and mathematics, by sexes, are given (*11*, 51) for 23 sports.

[20] Scoring keys for English, history, and mathematics are given (*11*, 51) for the 14 amusements.

between judges' estimates is .93 from which a reliability coefficient of .98 was computed. Judges' ratings of 27 vocations according to their significance in English, history, and mathematics, for boys and for girls, formed the scoring keys for "Vocations." [21] Here the average correlation between judges' estimates was .69 and the reliability coefficient .90. The list of words was rated for significance in English, history, and mathematics, forming the "Vocabulary" scoring keys. The average correlation between judges' estimates was .71 and the reliability coefficient .87. The individual score in vocabulary interests in a subject was the sum of the scores of the words checked, multiplied by the factor of accuracy. The "Factor of Accuracy" score was the claim made in knowledge of vocabulary for the 13 words asked to be defined, divided by the accuracy of the definitions which were grades 4, 3, 2, 1.[22]

Kelley's interest questionnaire, with its educational scoring keys for English, history, and mathematics, is a measure of both subjective and objective interests over a wide field. The purpose behind the measurement was prognosis of achievement. Regression equation technique was first applied here in interest measurement. Combination weights are given for the assembling of the scores for the various questions of the battery into a total interest score, as follows:

Score in English Interests = .2 (Sports) + .05 (Amusements) + .4 (Vocations) − 5.0 (Factor of Accuracy) + .08 (Vocabulary) + 3.3 (Magazines) + .165 (Books).

Score in History Interests = .2 (Sports) + .05 (Amusements) + .4 (Vocations) − 2.0 (Factor of Accuracy) + .08 (Vocabulary) + 3.3 (Magazines) + .165 (Books).

Score in Mathematical Interests = 2 [.2 (Sports) + .05 (Amusements) + .4 (Vocations) + 1.0 (Factor of Accuracy) + .08 (Vocabulary)].

Special and General Interest Inventories. Interest inventories have been used for both special and general measurement. Most of the investigations with special inventories have been for the purpose of quantitative study of groups

21 Scoring keys for English, history, and mathematics are given (*11*, 52) for the 27 occupations, separately for boys and for girls.

22 Sample questionnaires illustrate the scoring (*11*, 56-62) are given for the whole battery of questions.

rather than for individual adjustment. Illustrative of the special inventories are those used by Terman in his study of the interests of gifted and normal children[23] (*27*, 363-454). Two of these inventories for the special fields of the occupations and education will be mentioned.[24] The educational interest inventory was composed of 46 educational subjects which were classified as follows: Art, etc., Foreign Language, History, Practical Subjects, English, Mathematics, Physical Education, Science. The occupational interest inventory was a list of 125 occupations.

In the estimation of occupational interests the children were asked to "Put ONE CROSS before each occupation you MAY POSSIBLY DECIDE TO FOLLOW. Put TWO CROSSES before the ONE occupation you are MOST LIKELY TO CHOOSE. Put THREE CROSSES before the ONE OCCUPATION you would LIKE BEST to follow if you could." The percentage of the gifted and control groups choosing various occupations was computed for comparison. "The gifted children show greater preference for the following occupations: Public service, professional (boys), artistic, semi-professional, and agriculture (slightly). The control group expresses greater preference for the following: mechanical, etc., transportation, athletic, and clerical. The groups show little difference for commercial occupations and social work. There are more first choices for domestic and personal service (including secretarial work) by the gifted, but more second choices by the control group" (*27*, 375).

Various devices are used for the recording of the interest preferences in these special inventories. In the estimation in Terman's educational interest inventory a five-point scale of degrees is used, with instructions as follows:

First DRAW a LINE right THROUGH each subject you have NEVER STUDIED.

1. Next, put a figure 1 on the dotted line before each subject that you LIKE VERY MUCH.
2. Put a 2 before each subject that you LIKE FAIRLY WELL.
3. Put a 3 before each subject that you NEITHER LIKE NOR DISLIKE.

[23] The gifted children are children with an I.Q. of 140 or over. The normal children are children composing unselected or representative samples.

[24] The specialized inventories of educational interests and occupational interests are published in the *Genetic Studies in Genius* (*27*, 363-4; 374).

4. Put a 4 before each subject that you RATHER DISLIKE.
5. Put a 5 before each subject that you DISLIKE VERY MUCH.

Put a B before the ONE subject you like BEST OF ALL.

As this inventory was used in a study of gifted children and the comparison is with a control group of normal children the results are stated in average ratings for each educational interest in the list (*27*, 364-373). For example, the average ratings for drawing, painting and reading are shown in Table III.

TABLE III. AVERAGE (MEAN) RATINGS FOR EDUCATIONAL INTERESTS (TERMAN)

Children		*Drawing*	*Painting*	*Reading*
Gifted	Boys	2.18	2.34	1.28
	Girls	1.92	1.95	1.22
Control	Boys	2.04	1.92	1.67
	Girls	1.88	1.91	1.71

When these averages were ranked for the two groups, Terman found that the interests of the gifted demanded a larger amount of abstract thinking than those of the control group. This is a general tendency found in the educational interests of the two groups.

Other special inventories have been developed for the study of adult (*8*) and children's readings (*27*, 441-54). Play interests were studied very early. But most of these measures are of objective interests, by the questionnaire method of asking the child to tell the games played and things done during the last week, and so on. There are a few inventories of play likes and dislikes. The few measures of subjective play interests will be mentioned in connection with the discussion of play interests in Chapter IX.

The general interest inventory is a more recent development than the special interest inventory. It has taken form largely during the second decade of this century. It aims to include samples of all special interests—educational, vocational, amusements, readings and so on, and to score the inventory for special interests. "The University of Iowa Assayer" is a general interest inventory of this kind which is planned for use in the selection of college students.

"THE UNIVERSITY OF IOWA ASSAYER." The University of Iowa Assayer [25] or, as it was earlier called, "The Personnel Assayer," is an inventory of "likes and dislikes or interests and attitudes," which has been used in various investigations at the University of Iowa. The early edition of this inventory, devised by Hart in 1923 (*9, 10*), is composed of 21 lists of fifteen interest items, each with "plus" and "minus" signs after these items for the estimation of interests and aversions, as follows:

mice ..... −+	parents ..... −+	Drive an auto.. −+
obey ..... −+	Marconi ..... −+	Be scolded .... −+
pal ..... −+	Pasteur ..... −+	Tend a baby .. −+

The person answering the inventory is instructed to draw a circle around the "plus" sign after the items liked and to draw a circle around the "minus" sign after the items disliked, and to skip items neither liked nor disliked. In addition, he is instructed to underline five items, in each list of fifteen, about which he feels strongly, and to double underscore one item in each list about which he feels very strongly. Later modifications of these instructions substituted a "yes" for the "plus" sign and a "no" for the "minus" sign, but the underscoring procedure was continued throughout the use of this first edition, offering seven degrees for the rating of feeling, as follows: double underscored interest, single underscored interest, plain interest, indifference, plain aversion, single underscored aversion, double underscored aversion.

Hart's procedure has been modified by Shuttleworth (*24*) following an experimental trial of method. Three forms of the inventory were administered to 60 college students. One form used the original "plus-minus" and underscoring method of recording, with the inventory items organized into groups

[25] "The University of Iowa Assayer" is on file in the Department of Psychology, New York University, New York City. There are copies of the following forms:

1. Personnel Assayer. Prepared by Hart in 1923.
2. University of Iowa Assayer, Short Form. Prepared by Shuttleworth in 1924.
3. Experimental Inventory. Used by Shuttleworth in 1925.
4. University of Iowa Assayer, Second Edition. Prepared by Shuttleworth in 1925.
5. Short form of Second Edition. Prepared by Shuttleworth for personnel use at University of Iowa.

of fifteen. The second form embodied a slight modification of the method, adding a question mark to denote indifference, but keeping the groupings of fifteen items. The third form was a complete modification in procedure, in which the plan of grouping items is given up and the items are listed independently. The record of interests in this form is made by circling one of five symbols, denoting "like" in two degrees, "indifference" in one degree, and "dislike" in two degrees.

Of the 60 students to whom the three forms of the inventory were administered, 29 were students receiving high grades and 31 were students receiving low grades. The form showing the most significant differences between these two groups was the one in which the items were listed singly rather than organized into groups of fifteen. Upon inquiry, 73 per cent of the students taking the three forms preferred the single item form, with the five symbols, as the easiest to which to respond. Also, 30 per cent more items could be checked for a given unit of time in the use of this form.

This single item form established the procedure for the second edition (1925) of the Assayer, which has been used by Shuttleworth in several investigations at the University of Iowa. It includes, as did the earlier forms, both objects and activities as interests, a total of 200 items. A short form of this inventory, including 120 items, is now used as a part of the personnel procedure at the University of Iowa (*25*). The student answering the inventory is asked to tell how he feels towards the various items of the inventory. Instructions are given as follows:

Notice the list below. You are to
draw a cross through the D after the things you dislike very much.
draw a cross through the d after the things you dislike somewhat.
draw a cross through the ? after the things you feel indifferent about.
draw a cross through the l after the things you like somewhat.
draw a cross through the L after the things you like very much.

Some of the items of this inventory are given below:

anguish	D	d	?	l	L	steady pay	D	d	? l L
poker	D	d	?	l	L	America First	D	d	? l L
Beethoven	D	d	?	l	L	detail work	D	d	? l L
Moreuseofprayer	D	d	?	l	L	Popular Science Magazine	D	d	? l L

SEARCHING FOR GROUP INTERESTS WITH THE "ASSAYER." The University of Iowa Assayer has been applied to the investigation of distinguishing interests of social groups. Shuttleworth (*23*) attempted to distinguish between money and non-money interests by means of a modification of the first edition of the Assayer. He selected for this purpose a group of nineteen college men judged to be "money-minded" and a group of twenty-two college men judged to be "non-money-minded." The inventory was administered to these groups. Numerous items showed differences between these groups, which are illustrated in the results for the item "Study Philosophy." (Table IV)

TABLE IV. PERCENTAGE DIFFERENCES BETWEEN "MONEY-MINDED" AND "NON-MONEY-MINDED" FOR ITEM "STUDY PHILOSOPHY" (SHUTTLEWORTH)

	No (Double underscore)	*No* (Single underscore)	*No*	*O*	*Yes*	*Yes* (Single underscore)	*Yes* (Double underscore)
Money-minded	5	0	47	26	11	11	0
Non-money-minded	0	0	4	9	14	45	28

Seventy-five items in the inventory were found to distinguish the "money-minded" and "non-money-minded." A scoring key was made of these items and the score range for the individuals making up the two groups was found to be very wide, from —280 to 252. No validation of the interest items distinguishing these two groups of people has been made upon other groups judged to be money- and non-money-minded.

Hart (*10*) attempted to distinguish between normal and delinquent groups of children by means of the first edition of the Assayer. The inventory was administered to 525 fifteen-year-old school children and to various groups of delinquent children in institutions. A scoring procedure was used similar to that planned for distinguishing between the money-minded and non-money-minded groups. Items in the inventory were found to distinguish between delinquent and normal children, but there has been no validation of these interests to

see if they are distinguishing interests of normal and delinquent groups in general.

Shuttleworth (*24*), using data collected by Hart and Orlander, attempted to distinguish between the energetic and lazy student by his interests. Six hundred high school students were rated on an energy-laziness scale by their teachers. A form of the first edition of the inventory was administered to these students. Forty items in the inventory were found to distinguish between two groups of students formed by the energy-laziness ratings. An energy-laziness scoring key was made of these forty items, and seventy-five of the students' papers were scored. These scores correlated .63 with the teachers' ratings, which indicated a promising lead. The inventory was revised to include the 40 items with 185 new ones and administered to a control group of 237 Iowa freshmen of the Class of 1924. The papers were scored with the energy-laziness scoring key. First semester academic grades were used as the criterion of energy-laziness for the validation of the scoring key. The discouraging correlation of .09 was found, which caused the abandonment of the attempt to distinguish between energetic and lazy students by their interests.

Slaght (*26*) studied untruthfulness in children by means of a modification of the first edition of Hart's Assayer. In general, differences in interests between the truthful and the untruthful groups were so slight as to be considered insignificant. As far as the items of this inventory are concerned the interests of truthful and untruthful children are the same. Significant age differences were found, however. Nearly half of the items of the inventory showed a distinct difference in the marking between eleven-year-old children and fifteen-year-old children.

The Rating Scale of Interests. In the estimation of interests the rating scale has been very little used, although its technique would seem to be as applicable to the field of interests as to that of abilities. The author has used a rating scale of interests to assist the vocational counsel subject in his self-analysis (*5*, 40). This rating scale bases its interest degrees upon those existing among the workers in a certain vocation. The individual is asked to select from among his

business associates those who fit into each of five degrees on a scale of interests, as follows:

MAN-TO-MAN RATING SCALE OF INTERESTS (FRYER)

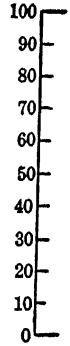
Highest Fifth	Mr. .....
A	Mr. .....
Excellent	Mr. .....
Second Fifth	Mr. .....
B	Mr. .....
Good	Mr. .....
Middle Fifth	Mr. .....
C	Mr. .....
Average	Mr. .....
Fourth Fifth	Mr. .....
D	Mr. .....
Poor	Mr. .....
Lowest Fifth	Mr. .....
E	Mr. .....
Unsatisfactory	Mr. .....

In this way a man-to-man scale of interest degrees in an occupation or business is formed. This is used by the subject in making an estimate of his own interests. He places himself alongside of the group with which he best compares, and thus secures an estimate of the degree of his interest in his work.

Kitson (*12, 13, 14*) has introduced into the interest rating scale a method of comparing one's vocation with other vocations. The measure is the degree of interests in one's vocation in relation to all others. The question is asked: How deeply are persons interested in their own vocations? It is answered by a comparison with their interests in other vocations. The individual is asked to rate the vocation in which he is working in relation to all other vocations, to compare it on a point scale of numerical values. He is to consider the 100-degree point the vocation in which he would spend his major time if he had a million dollars and did not have to work, which would allow him to work at anything he would wish. Then, he is asked to estimate the distance down the scale which repre-

sents the degree of his interests in his vocation. Kitson's vocation-to-vocation rating scale of interests follows.

VOCATION-TO-VOCATION RATING SCALE OF INTERESTS (KITSON)



Indicate, by making a check on this scale, the degree of interest you have in your occupation (not the present job, but the occupation itself). As the 100 degree point, think of that activity in which you would spend the major portion of your time if you had a million dollars and were not obliged to work. Then check the point on the right of the scale which denotes the degree of your interest in your present occupation.

The vocation-to-vocation rating scale has been used with hundreds of workers in a number of occupations. Kitson reports its use in rating the degrees of interest in their vocation by four hundred and nine elementary and secondary school teachers (*12*) and one hundred and forty graduate nurses (*13*). He finds an average (median) degree of interests in one's vocation of 90 per cent for both teachers and nurses. The distribution for the teachers is shown in the figure (Figure 1). (See p. 55.)

The vocation-to-vocation ratings of 247 high school teachers and the 140 graduate nurses are given (*14*) in Table V.

TABLE V. VOCATION-TO-VOCATION RATINGS OF TEACHERS AND NURSES (KITSON)

Degree of Interest	*Per Cent with rating*	
	Teachers	*Nurses*
100	17	33
90	39	33
80	26	21
70	9	5
60	3	0
50	2	6.5
40	1	0
30	1	.5
20	0	0

Degree of Interest	*Per Cent with Rating* *Teachers*	*Nurses*
10	0	·5
0	1	·5
Below 0	1	0

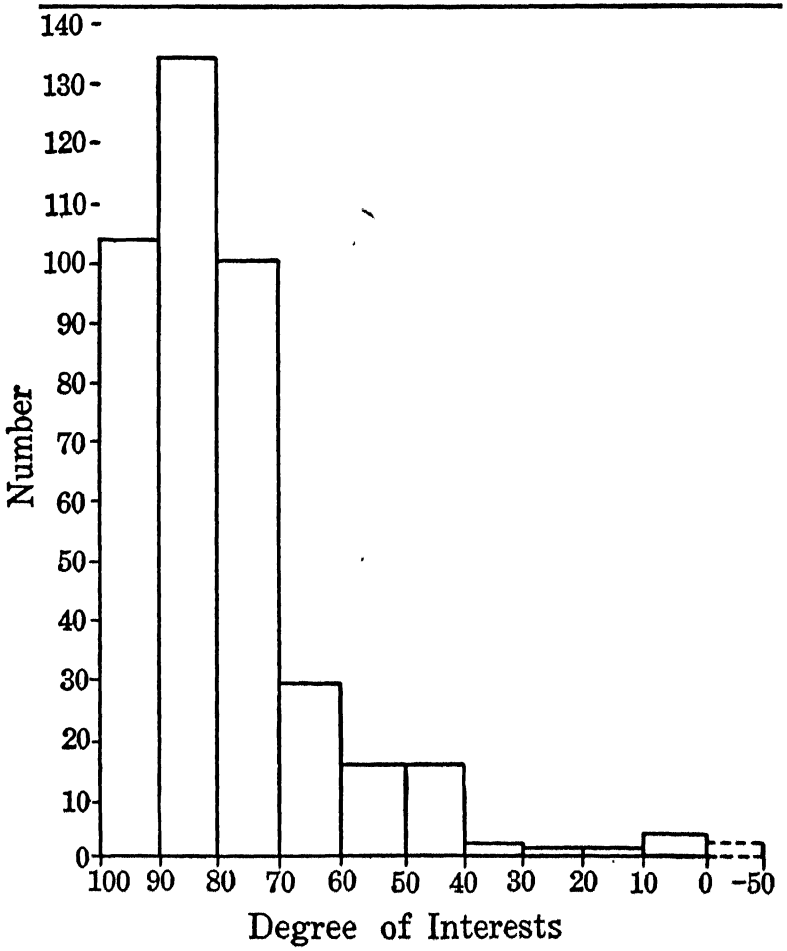


Figure 1. Estimates by 409 elementary and secondary school teachers of degree of interests in their vocation (after Kitson).

Similar figures for other vocations would be valuable in understanding the degree of interest to expect of an individual in his vocation.

Cox (*4*, 167-169) used a rating scale of interests in the study of the mental traits of 100 geniuses. The following interests and attributes of interests were rated:

1. Intellectual Interests
   Evidence of an urge toward mental activity in the direction of generalization and the derivation of universal laws.
2. Social Interests
   Evidence of an urge to participate in activities with other human beings.
3. Activity Interests
   Evidence of an urge to do, to act, to create, to make changes in the existing order.
4. Breadth of Distinct Interests
5. Breadth of Related Interests
6. Intensity of a Single Interest
7. Intensity of Two or More Interests

A seven-point scale of +3 to −3, with zero as the average for unselected people, was used, as follows:

+3	+2	+1	0	−1	−2	−3
highest degree	considerably above average	slightly above average	average	slightly below average	considerably below average	lowest degree

THE ESTIMATION OF INTERESTS (SUMMARY). In the study and measurement of the subjective interests the individual is asked to make an estimate of the kind and sometimes of the intensity of his feeling experience. A stimulating situation is presented to him, either actually or in the imagination, and he is asked to designate his feeling experience in relation to it. Sometimes degrees of these feeling experiences are requested. The three feeling experiences follow:

1. Interest Experience—A pleasant feeling experience as the individual is stimulated by an object or activity. (This is usually expressed in the interest inventory as a "Like.")
2. Indifference Experience—An experience of no feeling, as the individual is stimulated by an object or activity. (This is usually expressed in inventories as an "Indifference.")
3. Aversion Experience—An unpleasant feeling experience as the individual is stimulated by an object or activity. (This is usually expressed in inventories as a "Dislike.")

If the first condition is extreme, involving profound bodily feelings, the experience is spoken of as an emotion, rather than as an interest. It may even be in the form of an emotional attachment such as a fetich, which may sometimes be regarded as abnormal. These are the interests that develop martyrs and sometimes great men. If the condition of dislike is extreme, involving also profound bodily feelings, the experience would be spoken of as an emotion, possibly of disgust. It would be an extreme aversion and may be regarded as abnormal, as these conditions are infrequent.

The experimental concern, then, is with an estimate of feeling experience in relation to an object or activity in the environment. Thus, as in the study of ability the subject of investigation is the abilities in manipulating objects, so in the study of interests this becomes the interests or feelings in manipulating objects. In the estimation of interests we do not study interest as a faculty or a group of forces of the mind, we study interests which receive their names from the objects and activities causing the individual to react with pleasant or unpleasant experiences.

The estimation of subjective interests grows out of a confused past in which there is great concern as to the relation of these factors to adjustment. Questionnaires, inventories and rating scales in great number, as is indicated here, have been developed and various scoring procedures have been used in an effort to make this measurement useful in individual adjustment and in the comparison of groups. Kelley in 1913 was the earliest investigator to apply the elaborate statistical technique then being evolved to this problem. Other investigators have been content with more simple devices, but all have tended toward a measurement of the individual's interests in relation to a group standard. The methods used to improve the validity of the interest estimate may be summarized briefly as follows:

1. *Orientation Method:* Increasing knowledge of the objects of the environment and of the activities involved in reacting to these objects, by try-out courses in the occupations, reading, lists of occupations, and so on, before securing the individual's estimates of interests.

2. *The Interest Inventory:* Building a classification of stimulating objects or a classification of activities, and securing an estimate of like, dislike, or indifference, for purposes of systematic orientation.
3. *Objective Score for the Inventory:* Summarizing the expression of likes, dislikes, and indifferences of the inventory into a score representing degrees of general interests, or a score representing degrees of interests in a distinct field, a profession or occupation.
4. *The Rating Scale:* Estimating comparative interest in objects or activities upon a numerical scale of values.

In this chapter it has been our purpose to understand the methods of attack upon the problem of increasing the validity of the interest estimate and of summarizing these results into a score. The following two chapters will trace the development of the standardized interest inventories, which are in use today in the measurement of subjective interests.

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CHAPTER III

THE STANDARDIZATION OF THE GENERAL INVENTORIES

THE individual is in daily contact with objects and activities in his surroundings which make up his environment. His interests are the objects and activities which cause him pleasant feeling and his aversions are those which cause him unpleasant feeling. These are the tools with which he works, the school subjects he studies, the people he meets in daily intercourse, the games he plays, the ideas of his thoughts and the sentiments making up his individual philosophy of life. Subjective interests and aversions are the objects and activities of a person's environment of which he can report that they arouse in him a pleasant or an unpleasant feeling.

When it is considered that an individual's interests are the objects and activities that move him to pleasant and unpleasant feeling, it is possible to think of putting before the individual the names of a large variety of objects and activities and asking him to estimate his feeling toward them. This is the procedure followed in the development of a standardized interest inventory. The interest inventory presents to the individual a list of objects and activities which stimulate people, a sampling of all such stimuli, and asks him to estimate his feeling towards these objects just as if they were stimulating him. A person answering the inventory estimates pleasant feeling, unpleasant feeling, or no feeling experience. Or, he estimates like, dislike, or indifference. But the interest inventory does more than secure an estimate of the individual's feeling experience. It takes these estimates and summarizes them into a score indicating interest in a certain field of stimulation, for example, an occupation.

EARLIEST WORK UPON A STANDARDIZED INTEREST INVENTORY. Work was begun in 1919 at the Carnegie Institute

of Technology upon the interest inventory, as we know it in its standardized form today. There were earlier inventories, many much earlier, in fact, but none constructed with a statistically evaluated standardization technique and an objectively verifiable scoring method. This work began in the collection of items for the inventory in the graduate student seminar of Clarence S. Yoakum in 1919-20. From these beginnings has grown the general interest inventory in its various forms.

The earliest investigation in this group undertaking was one by Bruce Moore in which an attempt was made to measure the mechanical and social interests of engineers (*11*). Other early investigations from this source were studies made by Ream (*13*), who endeavored to distinguish by their interests between successful and unsuccessful salesmen, and by Freyd (*4*), who continued the research of Moore in a further attempt to distinguish by their interests between mechanical and social groups of people. Miner's work, already mentioned (*10*), upon the inventoring method was a factor in this undertaking which has made the measurement of interests a feasible enterprise.

Following this initial measurement of interests by means of the inventory at the Carnegie Institute of Technology, various kinds of interest inventories have been developed, including the forms of the inventory using activity items, which have been mentioned in Chapter II. Among other scattered contributions to the formation of the inventory are the inventories used by Terman, in his study of the interests of gifted children, and those of Hart and Shuttleworth, working at the University of Iowa, in an attempt to distinguish various social groups by their interests. But further work has continued in the development of a standardized inventory along the line laid down by its beginnings. Research under the direction of Strong at Stanford University and Paterson at the University of Minnesota has been most fruitful in increasing the scope and standardization of the inventories and the development of scoring keys designating the interests of various social groups. A new form of the interest inventory has also been developed by Garretson along similar lines for use at the high school level.

PRELIMINARY WORK AT CARNEGIE INSTITUTE OF TECHNOLOGY. Miner had already, in 1918, used an extensive interest inventory with high school pupils for orientation purposes (*10*). The results of this study contributed to the direction of the work in developing a standardized general inventory. One of the inventories contained in this blank, used the opposites method, as follows:

Do you like to live in the country? Do you like to live in the city?

This was tried out as a measurement device upon students at the Carnegie Institute of Technology. Yoakum's first seminar upon Interest, in 1919-20, prepared a list of approximately 1,000 questions covering interest situations from early childhood through the adolescent period up to about thirty years of age. These questions were divided into genetic groups marking off various growth periods. It was from this list that the various inventories took form.

The first one of these inventories was a list of fourteen items prepared by Moore for his study of the interests of Westinghouse engineers. This list was later increased to twenty items (*11*). Moore selected ten occupations which were of primary interest to those in mechanical pursuits and ten which were of primary interest to those in social pursuits. The occupations included in the list were determined by a group of fourteen judges. To these fourteen judges was submitted a list sampling all occupations. Each occupation was rated by each judge as to whether it was primarily a social or a mechanical occupation. Only where there was common agreement between the judges was an occupation included in the inventory. Moore's inventory is given below, divided into the two fields of interests according to the judges' estimates.

MOORE'S OCCUPATIONAL INTEREST INVENTORY

Mechanical Occupations	*Social Occupations*
architect	automobile salesman
automobile repairman	bank cashier
carpenter	editor of popular magazine
draftsman	hotelkeeper or owner
U. S. Government astronomer	lawyer

Mechanical Occupations	*Social Occupations*
machinist	newspaper reporter
pattern-maker	private secretary
research worker in physics	purchasing agent
toolmaker	real estate agent
watchmaker	stockbroker

Moore has used this inventory to see if it will distinguish between sales engineers and design engineers, two groups that were thought to have distinguishing social and mechanical interests. He scattered the items in administering the inventory and used the lists as a scoring key for social and mechanical interests as they are presented above.

Numerous other experimental inventories were produced and tried out by various members of Yoakum's seminar. A second preliminary inventory to study emotional stability was also a seminar undertaking. Craig became interested in the study of department store retail sales clerks (*2*). He used in this study several questionnaires developed in the seminar. One of these, "A Questionnaire of Interests and Preferences" [1] asked various personal questions to indicate affective and emotional conditions. One of the questions follows:

3. Here are some reasons which people give for liking certain occupations. If they would influence you to choose an occupation, draw a circle around *Yes*. If they would prevent you from choosing that occupation, draw a circle around *No*. If they would not influence you in any way, draw a circle around *O*. Do not skip any.

I like occupations in which

a. I do the same thing all the time	Yes	No	O
c. I can work on my own hook	Yes	No	O
d. I do mechanical work requiring little thought	Yes	No	O
e. I work in a quiet place	Yes	No	O
i. I have a chance to read	Yes	No	O

Another experimental inventory tried out by Craig is a list of "Occupational Preferences" [2] to which the subject indicates his preference by yes, no, or do not care, as follows:

[1] This inventory, totaling five detailed questions (two pages), is on file in the Department of Psychology, New York University, New York City.

[2] This inventory of "Occupational Preferences," totaling 49 items (two pages), is on file in the Department of Psychology, New York University, New York City.

4. I am told just what to do	Yes	No	O
8. I hold a position of responsibility	Yes	No	O
12. I have a chance to travel	Yes	No	O
49. I wear an attractive uniform	Yes	No	O

A third preliminary inventory used by Craig is an extensive list of situations related to the occupational world and to life in general, under the title of "Record of Preferences." [3] The individual taking the inventory is instructed to state whether he likes the situation, is indifferent to it or dislikes it, with directions as follows:

> Cross out one of the letters after each of the items below, as follows:
> Cross out L if you like it *very much.*
> Cross out l if you like it.
> Cross out ? if you have no decided feelings about it.
> Cross out d if you dislike it.
> Cross out D if you dislike it *very much.*

A few of the items will indicate the nature of the interest situations listed in the inventory.

Having customers tell you their troubles	L	l	?	d	D
Seeing a horse abused	L	l	?	d	D
Reading a "Photo-Play"	L	l	?	d	D
Speaking in public	L	l	?	d	D

This inventory was later revised, increased in length, and used by Craig in a study of department store employees in the R. H. Macy Company, New York (*2*). It is known in the Macy Co. files as "T6".[4]

A fourth preliminary inventory growing out of Yoakum's Seminar and tried out by Craig upon department store employees, is an "Interest Blank" [5] listing various activities and occupational tasks, such as running an elevator, swimming, being a private secretary, going to school, doing laundry work, being a waitress, playing banjo, writing poetry, carrying mail,

[3] The "Record of Preferences" totals 162 items (three pages) and is on file in the Department of Psychology, New York University, New York City.

[4] T6 is an inventory of 182 items. The directions for administration are the same as for the "Record of Preferences." The blank is on file in the Department of Psychology, New York University, New York City.

[5] This preliminary "Interest Blank" totals 102 items (one page). It is on file in the Department of Psychology, New York University, New York City.

teaching school, going to church, filing, shopping, being a farmer, sorting paper, and so on. In this inventory the person is instructed to note three letters after each item: L, D, O. "If you enjoy, or would enjoy that thing, cross out the L. If you dislike doing it, or think you would dislike doing it, cross out the D. If you are indifferent toward it, cross out the O. Be sure to cross out one of the three letters after each item." The two experimental inventories, the "Record of Preferences" and the "Interest Blank," indicate the form that the interest inventory takes in the hands of later investigators.

THE FIRST STANDARDIZED INVENTORY: THE CARNEGIE INTEREST INVENTORY. The standardization of the inventory commenced when inventory items were checked against results. A large amount of statistical analysis of items from the point of view of their validity in selecting groups is buried in the unpublished research of the workers on the interest inventory at the Carnegie Institute of Technology. For this reason the changes in items made from inventory to inventory often appear to be haphazard and the result of opinion. Little of the standardization work upon the items of the inventory has been published even by the more recent investigators.

Using the results of preliminary trials of the various inventories, Ream, Freyd, and other members of Yoakum's seminar prepared in 1921 the first interest inventory that can be considered as a standardized form for measurement purposes. This inventory was of two parts: (a) a section of occupational interests, calling for choices of occupations, which includes seventy-two samplings of outdoor and indoor occupations, solitary and social occupations, scientific, literary, executive, sales and mechanical occupations; and (b) a section upon general interests of one hundred and twenty-six likes and dislikes calling for choices of physical, mental, and other attributes of people. It is reproduced below as practically all of the general interest inventories are revisions of this inventory.[6]

[6] The Carnegie Interest Inventory, 1921 Edition, will also be found in an article by Max Freyd (3).

The Carnegie Interest Inventory (1921 Edition)

Part I—Choice of Occupation

After each of the occupations listed there are three symbols. Draw a circle around one of the symbols after each occupation, as follows:

Draw a circle around L if you would like doing that kind of work.

Draw a circle around D if you would dislike doing that kind of work.

Draw a circle around ? if you have no decided feelings toward that kind of work or know nothing about it.

Disregard any salary or social differences or any possible family objections. Consider only your interest and satisfaction in doing each of the kinds of work listed. You are not asked whether you would take up the occupation permanently; you are merely asked if you would enjoy that kind of work. Assume that you have the ability necessary for each of the occupations.

Be sure to draw a circle around one symbol after each of the occupations. Do not skip any.

Actor	L	?	D	Hotelkeeper or manager	L	?	D
Architect	L	?	D	Judge	L	?	D
Artist	L	?	D	Labor arbitrator	L	?	D
Astronomer	L	?	D	Lawyer	L	?	D
Auctioneer	L	?	D	Librarian	L	?	D
Automobile salesman.	L	?	D	Lighthouse tender ...	L	?	D
Auto racer	L	?	D	Locomotive engineer.	L	?	D
Auto repairman	L	?	D	Machinist	L	?	D
Aviator	L	?	D	Magazine writer	L	?	D
Bank teller	L	?	D	Mayor	L	?	D
Baseball player	L	?	D	Mechanical Engineer.	L	?	D
Carpenter	L	?	D	Member of Congress..	L	?	D
Certified public accountant	L	?	D	Musician	L	?	D
Chemist	L	?	D	Newspaper reporter ..	L	?	D
College professor	L	?	D	Novelist	L	?	D
Consul	L	?	D	Office clerk	L	?	D
Cook	L	?	D	Office manager	L	?	D
Dentist	L	?	D	Orchestra conductor..	L	?	D
Draftsman	L	?	D	Philanthropist	L	?	D
Editor	L	?	D	Poet	L	?	D
Explorer	L	?	D	Politician	L	?	D
Factory manager	L	?	D	Preacher	L	?	D
Farmer	L	?	D	Private secretary	L	?	D
Fisherman	L	?	D	Promoter	L	?	D
Forest ranger	L	?	D	Railway conductor ..	L	?	D
Foreign correspondent	L	?	D	Rancher	L	?	D

Real estate salesman..	L	?	D	Steeple-jack	L	?	D
Retail merchant	L	?	D	Stockbroker	L	?	D
Retail salesman	L	?	D	Street car conductor..	L	?	D
Secret service man ..	L	?	D	Surgeon	L	?	D
Ship officer	L	?	D	Tailor	L	?	D
Shop foreman	L	?	D	Teacher	L	?	D
Singer	L	?	D	Toolmaker	L	?	D
Social worker	L	?	D	Traveling salesman ..	L	?	D
Soldier	L	?	D	Typist	L	?	D
Specialty salesman ...	L	?	D	Watchmaker	L	?	D

Part II—Likes and Dislikes

Draw a circle around one of the symbols after each of the items below, as follows:

Draw a circle around L! if you like the item very much.

Draw a circle around L if you like the item.

Draw a circle around ? if you have no decided feelings toward the item.

Draw a circle around D if you dislike the item.

Draw a circle around D! if you dislike the item very much.

You may be in doubt in some cases. Use your own judgment, always encircling the symbols in the way which expresses your *most frequent attitude.*

Be sure to draw a circle around one symbol after each of the items. Do not skip any.

Fat men	L!	L	?	D	D!	Chinless people..	L!	L	?	D	D!
Fat women	L!	L	?	D	D!	People with hooked noses ..	L!	L	?	D	D!
Thin men	L!	L	?	D	D!	Cross-eyed people	L!	L	?	D	D!
Thin women	L!	L	?	D	D!	Blind people.....	L!	L	?	D	D!
Tall men	L!	L	?	D	D!	Deaf mutes	L!	L	?	D	D!
Tall women	L!	L	?	D	D!	Feeble people....	L!	L	?	D	D!
Short men	L!	L	?	D	D!	People whose eyes are set close together	L!	L	?	D	D!
Short women ...	L!	L	?	D	D!	Men who wear beards	L!	L	?	D	D!
Blondes	L!	L	?	D	D!	Bow-legged people	L!	L	?	D	D!
Brunettes	L!	L	?	D	D!	Self-conscious people	L!	L	?	D	D!
Very old people..	L!	L	?	D	D!	People who are slow in making decisions..	L!	L	?	D	D!
Children	L!	L	?	D	D!	Very polite people	L!	L	?	D	D!
Cripples	L!	L	?	D	D!	Progressive people	L!	L	?	D	D!
Side-show freaks	L!	L	?	D	D!						
People with gold teeth	L!	L	?	D	D!						
People with receding foreheads	L!	L	?	D	D!						
People with protruding jaws ..	L!	L	?	D	D!						

Conservative people ..... L! L ? D D!
Energetic people. L! L ? D D!
Absent-minded people ..... L! L ? D D!
People who disagree with you. L! L ? D D!
People more intelligent than you L! L ? D D!
People less intelligent than you L! L ? D D!
People who borrow things.... L! L ? D D!
Quick-tempered-people .....L! L ? D D!
Optimists ..... L! L ? D D!
Pessimists ..... L! L ? D D!
People who forgive very quickly ..... L! L ? D D!
Grudge-holders.. L! L ? D D!
People who tend to assume leadership ..... L! L ? D D!
People who are easily led .... L! L ? D D!
Jealous people... L! L ? D D!
Conceited people. L! L ? D D!
People who have made fortunes in business ... L! L ? D D!
Forgetful people. L! L ? D D!
Emotional people L! L ? D D!
Thrifty people .. L! L ? D D!
Spendthrifts .... L! L ? D D!
Stingy people.... L! L ? D D!
Talkative people. L! L ? D D!
Religious people. L! L ? D D!
Irreligious people L! L ? D D!
People who have done you favors L! L ? D D!
People for whom you have done favors ..... L! L ? D D!
People who get rattled easily.. L! L ? D D!
Witty people ... L! L ? D D!
Educated people. L! L ? D D!
Immoral people.. L! L ? D D!
Cautious people.. L! L ? D D!
Sick people .... L! L ? D D!
People who have no sense of humor ..... L! L ? D D!
Nervous people.. L! L ? D D!
People who always agree with you ..... L! L ? D D!
People who talk very loud .... L! L ? D D!
People who talk very low ..... L! L ? D D!
People who talk very fast..... L! L ? D D!
People who talk very slow..... L! L ? D D!
People who usually talk about themselves .... L! L ? D D!
Methodical people L! L ? D D!
Fashionably dressed people. L! L ? D D!
Carelessly dressed people. L! L ? D D!
Southerners .... L! L ? D D!
New Englanders. L! L ? D D!
Westerners ..... L! L ? D D!
Golf ..... L! L ? D D!
Fishing ..... L! L ? D D!
Professional baseball ..... L! L ? D D!
Tennis ..... L! L ?. D D!
Swimming ..... L! L ? D D!
Football ..... L! L ? D D!
Driving an automobile ..... L! L ? D D!
Taking long walks L! L ? D D!
Checkers ..... L! L ? D D!
Poker ..... L! L ? D D!
Solitaire ..... L! L ? D D!
Billiards ..... L! L ? D D!
Dancing ..... L! L ? D D!

Summer resorts..	L!	L	?	D	D!	Educational movies	L!	L	?	D	D!
Amusement parks	L!	L	?	D	D!	Travel movies...	L!	L	?	D	D!
Picnics	L!	L	?	D	D!	Vaudeville	L!	L	?	D	D!
Excursions	L!	L	?	D	D!	Musical comedy..	L!	L	?	D	D!
Smokers	L!	L	?	D	D!	Listening to a story	L!	L	?	D	D!
Conventions	L!	L	?	D	D!	Telling a story...	L!	L	?	D	D!
Sporting pages ..	L!	L	?	D	D!	Being the butt of a joke	L!	L	?	D	D!
Love stories	L!	L	?	D	D!	Arguing	L!	L	?	D	D!
Detective stories	L!	L	?	D	D!	Interviews	L!	L	?	D	D!
"Life"	L!	L	?	D	D!	Making a speech before a crowd	L!	L	?	D	D!
"Literary Digest"	L!	L	?	D	D!	Opening a conversation with a stranger.....	L!	L	?	D	D!
"New Republic" .	L!	L	?	D	D!	Being left to yourself	L!	L	?	D	D!
"System"	L!	L	?	D	D!	Teaching	L!	L	?	D	D!
"National Geographic Magazine"	L!	L	?	D	D!	Organizing a play	L!	L	?	D	D!
"American Magazine"	L!	L	?	D	D!	Living in the city	L!	L	?	D	D!
"Popular Mechanics" ...	L!	L	?	D	D!	Living in the country	L!	L	?	D	D!
Charlie Chaplin..	L!	L	?	D	D!						
Mary Pickford..	L!	L	?	D	D!						
Wm. S. Hart....	L!	L	?	D	D!						
Cowboy movies..	L!	L	?	D	D!						

The Carnegie Interest Inventory, 1921 edition, was used by Ream (*13*) and by Freyd (*4*) in their researches, aimed at developing scoring keys based upon distinguishing group interests which would replace with objective scoring criteria the subjective scoring criteria of judges' estimates used by Moore (*11*) and by Kelley in an earlier investigation (*8*). The individual taking the interest inventory was asked to circle one of the symbols opposite the separate items making up the inventory. The meaning of the symbols is described in the inventory.

A second edition of this inventory, under the title "Interest Analysis," [7] was published by the Bureau of Personnel Research, Carnegie Institute of Technology, early in 1923, which omitted from the occupational section the items of cook, librarian, soldier, and tailor, found to be lacking in distinguishing

[7] The second edition of the Carnegie Interest Inventory (Interest Analysis) with an occupational and general section of likes and dislikes (4 pages), is on file in the Department of Psychology, New York University, New York City.

significance, and added salesmanager and street-car motorman. This reduced the total of the occupational section from seventy-two items to seventy items. The general section was increased in length in this second edition from one hundred and twenty-six to one hundred and forty-nine items, adding: Harold Bell Wright, serial movies, working alone, working with things, Sunday Blue Laws, and at the end a list of school subjects was included, as follows: mathematics, physics, chemistry, physiology, manual training, shop work, mechanical drawing, ancient languages, modern languages, English composition, spelling, penmanship, history, civics, economics, commercial subjects, public speaking, sociology.

FREYD'S OCCUPATIONAL INTEREST INVENTORY FOR MEN AND WOMEN. Based upon this preliminary standardization of the items of the inventory Freyd published in 1923 for general use a revision of the occupational section under the title of "Occupational Interests."[8] This revision of the occupational section of the Carnegie Interest Inventory includes two forms, one for men of eighty items and one for women of sixty-seven items. In this inventory of occupational interests for men there are the following omissions from the occupational section of the 1921 edition of the inventory reproduced above: college professor, mayor, member of Congress, philanthropist, preacher, promoter, salesmanager, singer; and the following additions: army officer, athletic director, bookkeeper, cashier, chef, civil service employee, clergyman, factory worker, interpreter, landscape gardener, librarian, missionary, pharmacist, photographer, physician, printer, statistician. These changes raise the total of items to eighty, leaving sixty-three items as in the 1921 edition. The inventory of Occupational Interests for women includes many of the same occupations with slight changes adapting the form to use with women.

THE ARRAY OF SYMBOLS FOR ESTIMATING INTERESTS. The array of symbols used for the estimation of degrees of interests and aversions has varied from three to seven in the various investigations. In the forms of the inventory developed at the

[8] Freyd's inventory of "Occupational Interests," with forms for men and for women, is distributed by C. H. Stoelting Co., Chicago, Ill.

Carnegie Institute of Technology the occupational section started with three degrees of feeling (like, indifferent and dislike) in the first edition and added five (like very much, like, indifferent, dislike and dislike very much) in the form published by Freyd in 1923. The general section started with five degrees of feeling in the first edition and changed to three degrees in the second edition. There is nothing published to indicate the reason for these changes.

Experimental psychology offers as the result of introspective analysis the information that there are only two feeling qualities, pleasantness and unpleasantness. Either we like or we dislike, or we are indifferent. Where there are other differences it is due to different intensities of the two feelings. But it is also found that it is very difficult for a person to report intensity degrees of an interest or an aversion. It is possible that only the trained introspector can do so with a fair degree of accuracy. It is done only by comparing a certain feeling experience with some previous experience which has been estimated and is a standard in the mind. None of the investigators have used the five-symbols for separate statistical treatment. When used, the scores for the extreme "like," or "dislike," have always been combined with the ordinary "like," or "dislike," without weight. A possible use would be to take the extreme "like," or "dislike," as indicating a more valid estimate, one in which the estimator was surer of his estimate. The later investigators have generally used only the three symbols to describe the experiences of "like," "indifference" and "dislike."

SCORING THE INTEREST INVENTORY. The process of standardization of the items of an inventory is also a process of developing scoring keys composed of the most significant items for distinguishing groups by their interests. Where items are found not to distinguish any groups of people they are discarded from the inventory. Where they are found to be significant in distinguishing groups of people they are included in the scoring key which is made to rate an individual upon the closeness of his interests to those of a certain group.

Moore wished to score his inventory for social and mechanical interests. For this reason he built an inventory including

only items of social and mechanical interests. His inventory was composed of twenty items, ten of which were judged to be social interests and ten to be mechanical interests. He decided beforehand the nature of the items of the inventory and their scoring significance in the scoring key. His criterion or standard for this was drawn from the subjective estimates of 14 judges.

MOORE'S VALIDATION OF HIS SCORING KEY OF SOCIAL-MECHANICAL INTERESTS. Is the scoring key valid? Will it divide individuals into social and mechanical groups according to objective criteria of social- and mechanical-mindedness? To answer this question Moore selected a primary group of twenty-eight design engineers as the mechanical interest group and fifty sales engineers as the social interest group. He assumed in this, of course, that such individuals would be primarily interested in the occupations of their own professional field.

In administering the inventory, Moore asked each of these individuals to choose ten of the twenty occupations at which he preferred to work. He had them mark "plus" the ten they most preferred and "minus" the ten they least preferred. The score for each individual was the number of plus marks opposite the social occupations and the number of minus marks opposite the mechanical occupations, divided by the number of items checked. This is the percentage of sales interests, which is the score. Thus, low scores indicate mechanical interests and high scores social interests. Of course, this score might have been computed from plus marks for mechanical occupations and minus for social occupations, divided by the total number checked. Then the high and low scores would have indicated just the opposite.

Figure 2 shows the scores for Moore's primary group. The eggs represent the sales engineers and the crosses the design engineers. Fifty is the dividing line of scores between mechanical and social interests. At the left of this line more than 50 per cent of the interest choices of the engineers are in the mechanical field of interests. At the right of this line more than 50 per cent of the choices are in the social field of interests.

How well does the scoring key place the sales engineers and the design engineers in their proper groups? It is found that

there are 78 per cent correct placements of sales engineers and 82 per cent correct placements of design engineers. Based upon these percentages there is a correct selection of 80 per cent of the total group. This is in the situation where all individuals are either design or sales engineers and there is a 50 per cent chance selection. In selecting sales engineers separately from the group as a whole, 18 out of 100 design engineers would be selected as sales engineers along with the 78 out of 100 sales engineers. Subtracting the errors from the

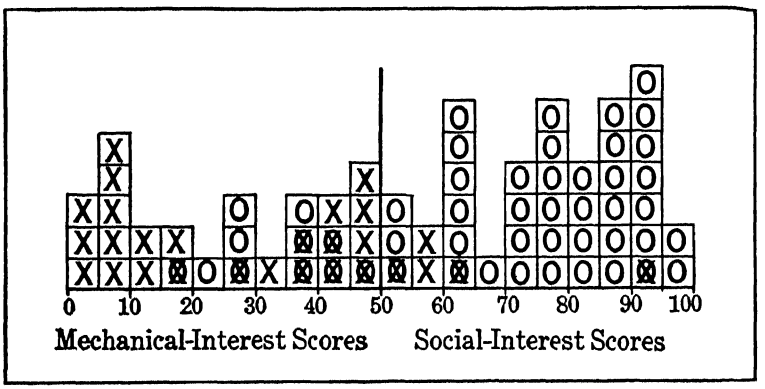

Figure 2. Moore's primary group of twenty-eight design engineers and fifty sales engineers, distributed according to their scores. x = design engineers. o = sales engineers (after Moore).

correct selections this might be interpreted as 60 per cent correct selection of sales engineers. If the inventory were used to separate design engineers from sales engineers the selective value would be the same. Assuming that the two groups of engineers are truly representative of the interests they were supposed to represent, these figures may be taken as indicating the validity of Moore's scoring key of social-mechanical interests.

Moore (*12*) gave his occupational interest inventory to several groups of engineers in training, and followed up these individuals as they went into design or sales engineering. Eighty-five per cent of one group of fifty-eight students would have been placed correctly by the inventory according to the occupation in which they were working two years after graduation. Sixty-eight per cent of another group of one hundred

and twenty-one students would have been placed correctly by the inventory according to the classification by executives who were supervising their work for a few months after graduation. Seventy-six of this group were retained by the company in which they were working, and the inventory placed seventy-four of them correctly according to the occupation in which they were working. A later follow-up found forty-one of this group with the company. Ninety per cent of these men were placed correctly by the inventory according to the occupation in which they were then working.

While Moore decided beforehand the significant items in his inventory by subjective criteria, or judgments, he might have gone further and corrected his scoring key by objective criteria, or, by what were found to be the interests of an occupational group as expressed in the inventory. This method, of using what a representative occupational group is interested in doing, and deciding what these items are after administering the inventory, is the method of all later investigators.

Developing a Scoring Key Upon Objective Criteria. The use of a general interest inventory with an extensive list of items and recording estimates of interests makes it possible to decide what significant distinguishing interests there are between individuals and between social groups. An inventory is administered to homogeneous groups to see what the individuals of one group estimate they are interested in doing, as distinguished from the individuals of other groups. The method of developing the scoring key, in general, is to decide from the record of interests what are the distinguishing items, rather than to decide by judgment beforehand what should be the distinguishing items.

Ream (*13*) attempted to distinguish by their interests between successful and unsuccessful salesmen, and to develop a scoring key for this purpose. These two groups were clearly defined by their production records of student practice selling of insurance. The first edition of the Carnegie Interest Inventory was used in this investigation. There was no time limit in filling out the inventory, and the system of three symbols in evaluating the results was used. While Ream found it impossible to distinguish by the interest inventory between

successful and unsuccessful salesmen, he applied to the interest inventory for the first time a method of scoring, based upon objective criteria, which has been used with modifications by all subsequent investigators.

REAM'S OBJECTIVE SCORING METHOD. Dividing his group according to their sales records into twelve unsuccessful salesmen and twenty-seven successful salesmen, Ream found the per cent of the successful and of the unsuccessful salesmen marking any particular symbol for all the items. Where this per cent was significantly large, the difference between the per cents marking the symbol of successful salesmen and unsuccessful salesmen (or vice versa) was found. To illustrate, if fifty-two per cent of the successful salesmen circled the symbol, "L", for the item actors, and twenty-six per cent of the unsuccessful salesmen circled this symbol, the difference is twenty-six per cent. The standard error of this difference was found by Yule's formula.[9] Where the difference between the percentage of successful and unsuccessful salesmen marking one symbol for any item was equal to the standard error of the difference, this item with its marking was used as a distinguishing item in the scoring key. All other items were disregarded in the scoring key as non-significant.

The successful salesman items were given the value of +1 and the unsuccessful salesman items, the value of —1. Thus a significant item in the scoring key denoting unsuccessful salesmen and rated —1 might be to like the item, or to be indifferent to the item, or to dislike the item, according to the difference in favor of unsuccessful salesmen marking the item. Also, the rating might be +1 for the marking of any of these symbols according to the difference being in favor of the successful salesmen. An individual's score was then computed as the algebraic sum of the plus and minus scores secured in the inventory.

In his study of mechanical and social interests (*4*) Freyd

[9] Yule's formula: $E^2_{12} = \frac{P_1Q_1}{N_1} + \frac{P_2Q_2}{N_2}$ where E^2_{12} is the standard error of the difference which is sought, P_1 is the per cent of one group circling the item, Q_1 the per cent of this group not circling the item, P_2 the per cent of the other group circling the item, Q_2 the per cent of that group not circling the item, N_1 and N_2 the numbers of the individuals in the two groups respectively. This formula is taken from Yule's *Introduction to the Theory of Statistics*, p. 269.

modified and developed Ream's procedure of establishing significant items for the scoring key. Only where the difference in per cent of cases was twice as great as the standard error of the difference was the item listed in Freyd's scoring key as a significant item. Ream had used all items in his scoring key when the difference in per cent was just equal to the standard error of the difference.

Ream's scoring method is given here, as it has been so extensively used, with modifications, by other investigators.

1. Divide the papers of those taking the inventory into the two groups to be distinguished. The criterion used for this purpose by Ream was sales records.
2. Work with each item of the inventory separately. Find the per cent of each group marking each symbol for the item. For example:

   Group 1. L. 10% I. 3% D. 87%
   Group 2. L. 80% I. 1% D. 19%

3. Find the difference in per cents between the groups marking the item. Let us assume that Group 1 is to be distinguished from Group 2. The difference in favor of Group 1 will be:

   L. −70% I. +2% D. +68%

   To dislike the item is the general feeling attitude of Group 1. Group 2 might be treated accordingly.
4. Find the standard error of the difference by Yule's formula and if the difference is one or more times the S.E. of the Difference (according to the investigator's plan of work) the item is used in the scoring key. For example: To like the item is scored −1 for the interests of Group 1, because most individuals in Group 1 do not like the item. To be indifferent to it is not scored because the difference is insignificant. This symbol is not in the scoring key. If the difference between groups for the indifference item were significant it would be included. To dislike the item is scored +1, because most individuals in Group 1 dislike the item.
5. The score for an individual is the algebraic sum of the plus and minus scores of the items of the inventory.

ADAPTATIONS OF THE CARNEGIE INTEREST INVENTORY. Based upon the partially standardized inventory and method of scoring developed at the Carnegie Institute of Technology several adaptations have been made for specific purposes. One of these, by Kornhauser at the University of Chicago, is an

adaptation of the general section of the Carnegie Interest Inventory for use with college students. Another by Paterson at the University of Minnesota is a revision of both the occupational and general sections of the Carnegie Inventory for use with college students. A third is a revision of the Minnesota Inventory by Hubbard for use with boys.

KORNHAUSER'S GENERAL INTEREST INVENTORY. Kornhauser's general interest inventory (*9*) is a long list of items relating to people, amusements, sports, hobbies, books, magazines, college studies, social and racial problems. It includes a sampling of items relating to many general activities but omits all reference to vocational activities.

It is founded upon the section of general items in the Carnegie Interest Inventory, totaling 126 items, which is increased here to 164 items with numerous changes and additions to adapt the inventory to college use. Only sixty-nine of the items in the Carnegie Inventory are found in Kornhauser's list.[10]

Five degrees of feeling, "like very much," "like," "indifference," "dislike," and "dislike very much" are described in the use of the inventory, as in the general section of the Carnegie first edition. But in the use of the inventory Kornhauser did not analyze the separate records for the extreme likes and dislikes. The markings for these items were combined. A few of the items of the inventory are listed below:

4. Impulsive people ..... L! L ? D D!
23. Teachers who are strict ..... L! L ? D D!
63. Written examinations ..... L! L ? D D!
119. Modern language ..... L! L ? D D!
131. Strikes ..... L! L ? D D!

THE MINNESOTA INTEREST INVENTORY. A direct offshoot of the research work in developing a standardized interest inventory at the Carnegie Institute of Technology has been carried on under the direction of Paterson at the University of Minnesota. Paterson arranged a revision of the Carnegie Inventory for use in the personnel work with college students.

10 Kornhauser's General Interest Inventory is on file in the Department of Psychology, New York University, New York City.

Both occupational and general items are included. Part I is a list of 100 occupational items, 63 of which are found in the Carnegie Inventory (1921 edition). Part II is a list of 100 items sampling the general interests of college students. Only 31 of these items are found in the Carnegie Inventory (1921 edition). Included are 6 personal characteristics, 30 sports and amusements, 13 magazines, 14 books, 32 educational subjects, and 5 other items. Almost all the personal items in the Carnegie Inventory were discarded. Such items as poker and Charlie Chaplin were omitted, and 8 sports played chiefly in high school and college were added to the list of sports and amusements. Several magazines, and 14 books covering the English classics as taught in high school and college, were included. The school subjects in the Carnegie Inventory are mostly high school subjects. The 32 educational subjects in the Minnesota Inventory contain a sampling of elementary school, high school, and college subjects. In this manner the inventory was changed to include the interests of college students.

The student answering the Minnesota Interest Inventory is asked to make an estimate of one of three feeling attitudes, "like," "dislike," and "indifference." Another symbol is introduced, that of "U," to be marked if the item is unknown. This is an addition to the technique of securing the interest estimate, separating the attitude of indifference from that of ignorance of the item. There are two attitudes which in previous inventories have been combined in the subjective estimate.[11]

HUBBARD'S "INTEREST ANALYSIS BLANK" FOR BOYS. Hubbard has made a revision of the interest inventory, basing her revision upon the Minnesota revision. Hubbard's "Interest Analysis Blank" was prepared for use with boys. The list of occupational items is reduced to a total of 116 and the list of general items to a total of 73. The administration technique is similar to the Minnesota Interest Inventory with slight changes in phrasing to make it more intelligible for use with boys.[12]

[11] The Minnesota Interest Inventory, for use with college students, is on file in the Department of Psychology, New York University, New York City.

[12] Hubbard's "Interest Analysis Blank" was developed in connection with the research investigation into mechanical ability tests at the University of Minne-

THE DEVELOPMENT OF THE INTEREST INVENTORY AT STANFORD UNIVERSITY. Another important development of the work at the Carnegie Institute of Technology is the research aiming at a standardized interest inventory carried on by Strong and Cowdery at Stanford University. Cowdery revised the Carnegie Inventory in 1924 and used it in a piece of research (*1*), the first of its kind separating occupational groups by their interests. Cowdery's interest inventory was later used by Strong in his researches into the interests of occupational groups which constitute the most extensive undertaking in the measurement of interests.

COWDERY'S INTEREST INVENTORY. Cowdery's "Interest Report Blank" is planned for general use and includes both occupational and general items. It is similar in aim to the Carnegie Inventory. The plan of estimation of degrees of feeling is changed somewhat. Only three symbols for the estimation of "like," "indifference" and "dislike" are used throughout both the occupational and the general sections of the inventory.

The inventory totals 263 items. It is of interest to see how it compares with the Carnegie Inventory in order to follow the standardization process. The nearest editions in point of date to Cowdery's are Freyd's inventory of Occupational Interest for men (3rd edition of Carnegie Inventory) and Part II, general interests of the second edition of the Carnegie Inventory. In a comparison with these editions there are added six occupational items and two omitted. There are added twenty-nine items to the general list and no omissions.[18] Cowdery classifies

sota and is published in *Minnesota Mechanical Ability Tests* by Paterson, Elliott, Anderson, Toops and Heidbreder (Minneapolis: U. of Minn., 1930, pp. 121-24). A "Questionnaire on Cultural and Mechanical Environment" was also developed in connection with this study (pp. 130-136) which includes questions upon "Mechanical Interests of Boys," "Recreational Interests of Boys," "Mechanical Interests of Father," "Mechanical Operations," "Tools in the Home," and so on.

[18] Additions by Cowdery to the occupational list of items are: building contractor, chauffeur, floor walker, gardener, marine engineer, naval officer. Omissions are: retail merchant and retail salesman. The additions to the general list are: Missourians, chess, pet animals, pet dogs, pet cats, pet monkeys, pet parrots, pet canaries, *Atlantic Monthly, Arts and Crafts,* Douglas Fairbanks, social problem movies, repairing electrical wiring, cabinet making, miscellaneous minor repairs, digging in the garden, meeting and directing people, taking responsibility, methodical work, meeting new situations, adjusting difficulties of others, regular hours of work, continually changing activity, art, botany, geology, literature, music, psychology.

(*1*) the 263 items of his inventory as follows: eighty-four occupations, seventy-eight types of people, thirty-four sports and amusements, six kinds of pets, thirteen kinds of readings, twenty-three miscellaneous activities, and twenty-five school subjects.[14]

THE PURDUE INVENTORY. A recent development of Cowdery's inventory called the "Purdue Interest Report Blank," has been made by Remmers at Purdue University (*14*). To the 263 items in Cowdery's blank were added a number of the paired comparisons from Miner's orientation blank and forty-five new items, presumably related to agriculture, such as, co-operative marketing, caring for horses, peddling produce, milking, and so on. The purpose of this adaptation, which included 349 items, was to assist in the selection by their interests of freshman engineering and agricultural students.

An extended list of degrees for the estimation of interests was tried out by Remmers in the use of the "Purdue Interest Report Blank" as follows:

Very Strong Dislike	*Marked Dislike*	*Some Dislike*	*Indifference*	*Some Liking*	*Marked Liking*	*Very Strong Liking*
1	2	3	4	5	6	7

Each of the 349 items in the interest inventory was rated upon this scale of seven degrees. To quote from the author: "It was thought at first that degrees of like or dislike relative to particular items might be significant. Inspection of the item tabulations of 100 blanks selected at random for students of agriculture and of 200 blanks for students of engineering showed, however, that this hypothesis was not borne out" (*14*). In the analysis of the items all degrees of dislike were combined and all degrees of like were combined.

[14] Cowdery's Interest Inventory is distributed by The Stanford University Press, Stanford, Calif. It has been superseded by the "Vocational Interest Blank," prepared by E. K. Strong, Jr., which is distributed by the same press.

STRONG'S "VOCATIONAL INTEREST BLANK."[15] The foremost development of a standardized interest inventory for general use with adults has been carried out by Strong. This inventory, appearing in 1928, is a revision and extension of Cowdery's inventory, based upon the research in the measurement of occupational interests carried on at Stanford University. After using Cowdery's inventory for some time, the conclusion was reached by Strong that if the inventory contained more items it would be a more valid measure. Strong has increased the number of items from 263 to 420. The items are classified into eight parts:

I. Occupations.
II. Amusements.
III. School Subjects.
IV. Activities.
V. Peculiarities of People.
VI. Order of Preference of Activities.
VII. Comparison of Interest between Two Items.
VIII. Rating of Present Abilities and Characteristics.

Several new features are included in the revision. Part I is the revised occupational interest section and Parts III to V are the revised, and now much enlarged, general interest section of the Carnegie Inventory. Parts VI to VIII are new. Separate instructions are given for each part. A new feature introduced into the instructions is to "work rapidly." This has for its purpose the securing of the individual's immediate estimate of how he feels when confronted by the interest situation, which is considered to be a more accurate estimate of feeling than that gained through reflection. Three symbols for the expression of feeling are used: "like," "indifference," and "dislike."

The occupational section of the interest inventory has remained much the same since the first edition in 1921. Of the 72 occupational items in the Carnegie Inventory 57 are found in "Part I, Occupations" of Strong's inventory. Cowdery, it will be recalled, made few changes in this section. In the revi-

[15] The "Vocational Interest Blank" by E. K. Strong, Jr., is distributed by the Stanford University Press, Stanford, Calif.

sion of Cowdery's inventory by Strong, there are sixteen omissions and thirty-two additions to this part, raising the total from eighty-four to one hundred items.[16]

In contrast to the few changes in the occupational section of the interest inventory, the general section has gone through an extensive development. The 1921 edition of the Carnegie Inventory was largely made up of peculiarities of people and amusements. A few general activities (nine) were included. The second edition added a list of school subjects. Paterson extended the list of school subjects. Kornhauser developed the peculiarities of people in college. In Strong's inventory, the general interests are classified according to "amusements," "school subjects," "activities," and "peculiarities of people."

Numerous changes of Cowdery's inventory have been made in "Part II, Amusements," but it remains about the same length. In commenting upon these changes Strong says that eliminations here, and elsewhere, in the inventory were based on the fact that these items did not add anything to the differentiation between occupational groups. There are nineteen eliminations from this section and twenty additions.[17] "Part III, School Subjects," extends Cowdery's list of twenty-five to thirty-nine.[18] There has been a gradual process of building up

[16] Those omitted were baseball player, chauffeur, chef, fisherman, forest ranger, gardener, lighthouse tender, missionary, newspaper reporter, naval officer, novelist, photographer, steeplejack, street car conductor, street car motorman, and teacher. Added have been advertiser, author of novel, author of technical book, buyer of merchandise, cartoonist, civil engineer, college professor, electrical engineer, employment manager, florist, governor of State, interior decorator, inventor, jeweler, laboratory technician, corporation lawyer, life insurance salesman, manufacturer, mining superintendent, music teacher, photo engraver, playground director, general reporter, sporting page reporter, retailer, sales manager, school teacher, sculptor, secretary of Chamber of Commerce, undertaker, wholesaler, worker in Y.M.C.A.

[17] Eliminations are professional baseball, swimming, football, dancing, summer resorts, pet animals, pet dogs, pet cats, pet parrots, love stories, Harold Bell Wright, William S. Hart, Charlie Chaplin, Mary Pickford, Douglas Fairbanks, serial movies, listening to a story, telling a story, being the butt of a joke; and additions are hunting, boxing, bridge, observing birds, solving mechanical puzzles, playing a musical instrument, performing sleight-of-hand tricks, collecting postage stamps, drilling in a company, chopping wood, "rough-house" initiation, full-dress affairs, auctions, fortune tellers, animal zoos, art galleries, museums, symphony concerts, snakes, poetry.

[18] There is one elimination: commercial subjects; additions total fifteen: algebra, agriculture, arithmetic, Bible study, bookkeeping, calculus, dramatics, geography, geometry, military drill, nature study, philosophy, physical training, shorthand, typewriting.

this list since its first inclusions in the second edition of the Carnegie Interest Inventory. "Part IV, Activities," has been extended and the items stated in greater detail. Such items as "repairing a clock," "handling horses," "looking at a collection of rare lace" now appear. Thirty-five new items have been added. In his revision of this part Strong has retained all but six of the activity items in Cowdery's inventory.[19]

"Part V, Peculiarities of People," has received the most drastic changes in the Strong revision. These items formed the foundation of the early general sections of the interest inventory and they are largely responsible for the widespread criticism that the interest inventory is "foolish," "silly," and "a waste of time." In the early general sections of the inventory the most criticized items happened to be grouped in one column, for example, "fat women," "children," "bow-legged people." This violated a general principle of measurements of making the inventory appear practical. These items have been scattered or eliminated from Strong's revision and the section has been planned to appear more practical and difficult. In commenting upon this change Strong says that these items were a very serious handicap in the use of Cowdery's inventory and had to be changed regardless of any other consideration. This section has been reduced to fifty-three items with thirty-nine eliminations in Cowdery's inventory, which totaled seventy-eight, and an addition of fourteen new items.[20]

[19] Those retained total seventeen, as follows: arguments, interviews, making a speech before a crowd, opening conversation with a stranger, being left to yourself, teaching, organizing a play, repairing electric wiring, cabinet-making, meeting and directing people, taking responsibility, methodical work, meeting new situations, adjusting difficulties with others, regular hours of work, continually changing activity, living in the city. Those discarded are: working alone, working with tools, minor repairs, digging in the garden, living in the country, Sunday Blue Laws.

[20] Items eliminated are fat men, fat women, thin men, thin women, tall men, tall women, short men, short women, blonds, brunettes, children, people with receding foreheads, chinless people, cross-eyed people, feeble people, people with eyes close together, men who wear beards, bow-legged people, people slow in making decisions, very polite people, people with opinions opposite to your own, people less intelligent than you, people more intelligent than you, people who forgive very quickly, grudge-holders, jealous people, conceited people, forgetful people, stingy people, people for whom you have done favors, educated people, immoral people, people who have no sense of humor, people who talk very low, people who talk very fast, Southerners, New Englanders, Westerners, Missourians. New items are: people who are natural leaders, gruff men, foreigners, negroes, people who do not believe in evolution, socialists, bolshevists, independ-

Strong has introduced three new sections into the inventory, Parts VI, VII, and VIII, with the purpose of differentiating between different kinds of executives. A large proportion of the new items of Strong's inventory was selected with this purpose in mind. "Part VII, Comparison of Interest Between Two Items," was added as an experiment. Any single item can be interpreted in a variety of ways. If a comparison is requested the breadth of interpretation is greatly decreased. Several investigations are testing the value of this kind of presentation of interest items which was used early by Miner. In its administration thus far "Part VIII, Rating of Present Abilities and Characteristics," has proved to be the most popular part of the entire inventory with "Part VI, Order of Preference of Activities," as a close second. If cooperation in filling out the blank is received, it will be received here. "Part I, Occupations," is reported to be the least popular. The table (Table VI) shows the work of revision by Strong of Cowdery's inventory.

TABLE VI. A COMPARISON OF ITEMS IN COWDERY'S AND STRONG'S INVENTORIES

Groups	*Cowdery's Inventory*	*Strong's Inventory*	*Retained from Cowdery's Inventory*
Part I, Occupations	84	100	68
Part II, Amusements	53	54	34
Part III, School Subjects	25	39	24
Part IV, Activities	23	52	17
Part V, Peculiarities of People	78	53	39
Part VI, Order of Preference of Activities	..	40	..
Part VII, Comparison of Interest	..	42	..
Part VIII, Rating of Present Abilities and Characteristics	..	40	..
	263	420	182

One hundred and eighty-two items [21] in Strong's inventory are the same as those found in Cowdery's revision. There are two hundred and thirty-eight new items.*

ents in politics, teetotalers, men who chew tobacco, women cleverer than you are, men who use perfume, people who chew gum, athletic men.

[21] There is a difference here with Strong's figures which gives the total of items retained from Cowdery's blank of 176.

* A revision of the occupational section of the Carnegie Inventory has been prepared by Manson for use with women. See Appendix V.

THE EVOLUTION OF THE INTEREST INVENTORY. The standardized interest inventory has grown from small beginnings and in the short space of ten years. A tremendous amount of work has gone into the selection of its items. Since the initial effort to select items for the interest inventory work has progressed in two directions:

1. To sample all interests (likes), aversions (dislikes), and indifferences of human beings. The aim here is not to collect into an inventory all items of interest, aversion, and indifference. This would mean a listing of all stimulating objects and activities of the human being. In the occupational field alone there are over 20,000 different specialized occupations. A task of this kind would be impossible. The aim is rather to secure a sample representing all these stimulating objects and activities.
2. A second working aim has been to select interests, aversions, and indifferences that distinguish between groups of people, occupational groups in particular, and to discard from the items of the inventory the common interests, aversions, and indifferences of the different groups.

The selection of items for the standardized inventories just described, while started under the sampling plan (No. 1), has been carried on with the aim of securing discriminating likes, dislikes, and indifferences between groups. Non-discriminating items have been discarded from the inventory; only discriminating items have been included as it has developed. Interests, aversions, and indifferences have been selected in so far as they discriminated individuals of one group from another, for example, lawyers from engineers. Those items not discriminating were discarded by investigators, and the result, as illustrated by Cowdery's and Strong's revisions, is a list of items either found to discriminate individuals of one group from another, or thought by the investigator to have discriminating value.

It can readily be appreciated that various criteria have been used by the numerous investigators in the selection of the items of the inventory. In fact, this could not have been avoided. Items have been included or discarded from various points of view. Marrow [22] has made a study of the development of the standardized inventory, beginning with the first edition of the

[22] An unpublished study, "An Analysis of Interest Inventories," which is on file in the Department of Psychology, New York University, New York City.

Carnegie Inventory and ending with Strong's "Vocational Interest Blank." He has included nine editions, the 1921 and 1923 editions of the Carnegie Inventory, Freyd's inventory of "Occupation Interests," for men and women, Kornhauser's revision, the Minnesota Interest Inventory, Hubbard's "Interest Analysis," Cowdery's revision and Strong's "Vocational Interest Blank." Classifying the items into various kinds of interests Marrow shows the frequency of the inclusion of the same items in these nine inventories. The frequencies in the rows opposite the grouping at the left in the table (Table VII) will be interpreted as the number of items found with the frequency in the various nine revisions of the interest inventory given at the top of the columns in the table. The first column gives the total number of different items included in the inventory revisions.

TABLE VII. FREQUENCY OF REPETITION OF ITEMS IN INTEREST INVENTORIES (MARROW)

Kind of Interest Items	*Total Number of Items*	*Number of Items Appearing*								
		once	*twice*	*three*	*four*	*five*	*six*	*seven*	*eight*	*nine*
Occupational.....	191	80	18	12	10	10	19	30	12	0
Job Analysis.....	95	73	17	2	3	0	0	0	0	0
School.....	60	29	5	6	7	8	5	0	0	0
Recreation.....	97	49	13	5	8	16	6	0	0	0
Social-Vocational.	41	41	0	0	0	0	0	0	0	0
Kinds of People...	180	93	19	31	26	7	4	0	0	0
Total.....	664	365	72	56	54	41	34	30	12	0

There are 664 different items appearing in the nine revisions of the interest inventory. No item has a frequency of nine. This is not to be expected when it is recalled that general interest items are not included in two of the inventories and occupation interest items are not included in one revision. Hence there is only a possibility of a frequency of eight for the occupational items and seven for the general items. The occupational items are the most consistently used throughout these revisions of the interest inventory. Forty-two, or 22 per cent, appear seven times or more, while 80, or 42 per cent,

appear only once. Of the total of 664 items only 171, or 24 per cent, appear four times or more, while 365, or 55 per cent, appear only once in these nine inventories. A great many of the changes are evidently made in adapting the inventory to specific purposes, but this study by Marrow serves to show at a glance the fluctuation of the items from revision to revision.

A NEW FORM OF THE INTEREST INVENTORY FOR HIGH SCHOOL USE (GARRETSON'S "PREFERENCE QUESTIONNAIRE"). Garretson (5) has constructed an entirely new form of the interest inventory. He undertook this project from the point of view that none of the existing inventories met the requirements of the level of development for which he planned to use the inventory. Garretson's "Preference Questionnaire" is prepared for use with ninth grade pupils in high school, primarily for the purpose of educational adjustment to academic, technical, and commercial training, for which it is scored.

The following seven criteria were set up by Garretson for the assembling of the items of the interest inventory by a group of 54 teachers who cooperated with him in the undertaking.

1. The items concerning which the pupils are asked to express preferences should lie within their field of experience.
2. The questionnaire should sample the preferences over a wide field.
3. The vocabulary used must be easily understood by the group for which it is intended.
4. Sufficient choice must be allowed in the responses to provide an adequate statement of attitude.
5. The responses must be of such a type as to permit objective scoring and evaluation.
6. All directions required for the administration of the questionnaire should be clearly stated as a part of the questionnaire.
7. The total time required for the administration of the questionnaire should not exceed forty-five minutes.

One thousand and seventeen different items were tabulated in this manner, to which 338 were added from other sources. From this list were selected 328 items for the inventory which might differentiate between academically, technically, and commercially interested pupils.

The 328 items composing Garretson's "Preference Question-

naire" [28] are administered in nine parts. The following general instructions are a part of the inventory:

> The purpose of this test is to measure your interest in various things, occupations, and activities in which people in general are interested. Be strictly honest in answering these questions. Your paper will not be given to your classroom teachers. The necessary directions are given before each test. Read these directions carefully. You will have plenty of time, but it is necessary that you work fast. *Mark Every Item.*

A three-symbol system of like, indifference, or dislike (L, I, D) is used for the recording of interests. The classification of the material and one item from each part will serve to illustrate this inventory (Table VIII).

TABLE VIII. PARTS OF GARRETSON'S "PREFERENCE QUESTIONNAIRE"

Section of Inventory	*Number of Items*	*Record Symbols*	*Illustrating Item*
1. Vocations	65	L I D	Wireless Operator
2. Activities	63	L I D	Wear new clothes
3. Things a boy might care to own	61	L I D	Victrola
4. Magazines	32	L I D	*Snappy Stories*
5. Elementary school subjects	20	L I D	Spelling
6. Qualities that are admired in most people	25	L I D	Skill in athletics
7. Positions in connection with the school paper	15	First three preferences to be recorded	Editor
8. Prominent men	12	First three preferences to be recorded	J. P. Morgan, banker
9a. Activities in which father engages	17	L I D	Sharpen tools
9b. Activities in which mother engages	18	L I D	Cook

THE VALIDATION OF THE INTEREST INVENTORY AS A MEASURE OF SUBJECTIVE INTERESTS. The validation of the interest

[28] Garretson's "Preference Questionnaire" is published in complete form. (*5*, 10-17.)

inventory as a measure of subjective interests has been neglected to a surprising degree. The validation of the interest inventory is a different problem from the validation of a scoring key for group interests. The scoring key must represent the interests of a social group in order to score for that group's interests. It has been assumed that, when summed together, the items of the inventory, which call for estimates in greater detail than the usual estimates of vocational and educational interests, will represent the true feeling attitude of a person. But the problem of testing out what the interest inventory measures has been given very little attention.

Hubbard (*6*) correlated vocational interest estimates and scores in her "Interest Analysis" for 331 high school boys. She used a rough method of correlation, the like and unlike sign method, dividing the interest estimates arbitrarily into two groups of social and mechanical occupations and dividing the inventory scores into two similar groups by a Social-Mechanical Interest Scoring Key. This comparison offered a coefficient of .73, which would imply that inventoried interests resemble estimated interests to a fairly high degree. As validity correlations go this is a high relationship.

The validity of the inventory can be interpreted from a comparison of the interest choices in the inventory, when combined into occupational ratings, and the occupational decisions of the individuals.

Strong (*16, 17*) administered his "Vocational Interest Blank" to 282 Stanford University seniors in 1927, and nine months later, at graduation, a report was secured from two-thirds of those who had made an occupational decision. Comparing the occupational interest scores in the inventory with the occupational choices it was found that 71 per cent had selected the occupation in which they rated highest or second highest. Twelve per cent selected an occupation in which they rated low. These men were not given their scores in the inventory. The results indicate high validity for the interest inventory, based upon the criterion of occupational choices. Strong also secured reports six months after graduation from 156 of these students of the occupations which they were definitely planning to enter. Forty-six per cent were entering the occu-

pations in which they scored highest in the inventory. Seventy-seven per cent were entering the occupations in which they scored first, second or third highest. Only 18 per cent were entering occupations for which their scores in the inventory showed them to possess few interests. Strong reports a follow-up of this group two years later in which 47 per cent were found to be entering the occupations in which they scored highest, and 79 per cent the occupations in which they scored first, second or third highest (*19*). If it can be said that the occupation that a man enters is one in which he is highly interested these results indicate high validity for the occupational scoring keys as well as for the interest inventory.

LATER DEVELOPMENTS IN SCORING TECHNIQUE. Developments in scoring technique have paralleled the development and standardization of the interest inventories. A slight change in scoring method was introduced by Kornhauser (*9*) while using his General Interest Inventory at the University of Chicago. He included in his analysis a third group lying between the two groups to be distinguished. He selected at random 15 of the students who achieved the highest grades in their class, 15 of the students with intermediary grades, and 15 of the students with the lowest grades in their class from a group of 110 students answering the inventory. The intermediary group of students from which he selected his sample of 15 students was composed of fifty per cent of the class and each of the other two groups of twenty-five per cent of the class. The per cent of each of these groups marking L! or L, ?, D or D! for each item in the inventory was next secured. Then the difference was found between each group's markings and the markings of the other two groups for any item. For the item, physics, the per cents were as follows:

The per cent of high group marking L! or L	93 per cent
The per cent of low and intermediary groups marking L! or L	40 per cent
(The per cent of intermediary group was weighted double because it represents the interests of half the class)	—
The difference of per cents	53 per cent

If the difference of per cents exceeded the standard error of the difference, which in the above illustration is .097, the marking of the item under scrutiny was considered a distinguishing interest of the high group. The same procedure, described above, was followed for both "high" and "low" groups with all items.

CONTRIBUTIONS TO SCORING METHODS BY COWDERY AND STRONG. Cowdery and Strong have developed scoring keys to distinguish occupational groups. In this work they have made several important changes in the scoring technique, which will be noted (*1, 15, 18*). A separate scoring key is, of course, necessary for each occupation, and the procedure for its development is as follows: The Interest Inventory is administered to individuals in several occupations. The per cent of responses of "like," "indifferent," and "dislike" for each item in the inventory is compared for each occupation with the per cent of individuals in general, that is, those in numerous occupations. Strong used from 50 to 100 individuals as a sample to represent the interests of an occupational group in his early work upon scoring keys. Later on it was found that this was not a large enough sample and since then all his scoring keys have been based upon about 250 cases. Strong thinks it is probable that a slightly higher degree of accuracy would be secured with the use of 500 cases as an occupational sample. A "non-group," or group of "men in general" as it is called by Strong, is used for comparison of the interests of an occupational sample in devising scoring keys.

In Cowdery's work upon scoring the inventory all the symbols for each item were brought into the individual score, according to the degrees of importance of each of these symbols in the interests of the group upon which the scoring key was devised. The method may be described as follows: The difference between the per cent for the occupation for which a scoring key is being devised and the per cent for "men in general" is secured. The records for all symbols (L, I, D) for each item are used. Where the difference is in favor of the occupation for which the scoring key is being devised the item is given a positive value, and where the difference is against the occupation it is given a negative value. Thus far the

method is that of Ream. But Cowdery determined a weighted score for each item of the inventory by a formula devised for him by T. L. Kelley.[24] The item is not discarded as in Ream's method when there is no significant difference for either of the two groups to be distinguished from each other, but it is included in positive or negative degrees according to the amount of this difference. This includes each symbol of every item in the individual score, and should increase the accuracy providing the items of the inventory are distinguishing occupational group interests.

The procedure for the development of a scoring key for an occupation, of course, begins with the raw likes, indifferences, and dislikes of the sample group. The totals of likes, indifferences, and dislikes for the occupational group are reduced to percentages and set off against the percentages for "men in general." From these percentages are calculated the differences in percentages between the "men of the occupation in question" and the "men in general." There follow (Table IX) similar calculations by Strong (*18*) for five items of the inventory.

TABLE IX. PRELIMINARY CALCULATIONS FOR THE DEVELOPMENT OF A SCORING KEY (STRONG)

Items	*Per Cent of "Men in General"*			*Per Cent of "Men of Occupation in Question"*			*Differences in Per Cents*		
	L	*I*	*D*	*L*	*I*	*D*	*L*	*I*	*D*
Actor (not movie) ...	25	34	41	9	30	61	—16	—14	20
Advertiser	32	39	29	13	38	49	—19	— 1	20
Architect	42	37	21	57	32	11	15	— 5	—10
Army Officer	26	29	45	32	36	36	6	3	— 9
Artist	33	37	30	29	38	33	— 4	1	3

[24] The following description of Kelley's formula for securing the weighted score by a modification of the technique of securing multiple regression equation coefficients is given by Cowdery (*1*): "The weighted score b is obtained from the formula $b = \frac{\phi}{(1-\phi^2)\sigma}$, where ϕ is the coefficient of correlation for the fourfold table, the formula being $\phi = \frac{ad-bc}{\sqrt{(a+c)(b+d)(a+b)(c+d)}}$, and where the fourfold table contains the number of responses given to an item by a group of members of a profession on one row and by non-members of that profession on the other row. The columns of the table are a dichotomization of the L-I-D series of possible responses."

Such data as this, of course, would distribute themselves in the form of a six-fold table. There are the "Likes," "Indifferences," and "Dislikes" for the two groups. Cowdery (*1*) reduced them to a four-fold table by dividing the "indifferences" among the "likes" and "dislikes." Strong (*18*) has followed the procedure of combining the "indifferences" and "dislikes" together when calculating the weights for the "likes," combining "likes" and "dislikes" together when calculating the weights for the "indifferences," and so on. The procedure is similar to that introduced by Kornhauser (*9*). Strong (*18*) describes the calculation of the score for the item "actor," for which the per cents of likes, dislikes, and indifferences for the "Men in General" and the "Men of Occupation in Question" are as follows:

"Men in General"	*"Men of Occupation in Question"*
L 25 per cent	L 9 per cent
I 34 per cent	I 30 per cent
D 41 per cent	D 61 per cent

The following formula, modified from Cowdery, is used by Strong (*18*), in which the score is multiplied by 10 and the nearest whole number is taken in order to eliminate the use of decimals. A plus or a minus sign is assigned to the score, of course, depending upon whether the percentage is positive or negative for the "men of the occupation in question."

$$\text{Score for Item} = 10\frac{\phi}{(1-\phi^2)\,\sigma} \quad \text{where } \phi = \frac{a-c}{\sqrt{(a+c)\,(b+d)}} \quad \text{and}$$

$$\sigma = \tfrac{1}{2}\sqrt{(a+c)\,(b+d)}.$$

The calculation of the score for the item "actor" is as follows:

$$\frac{a \cdot 25 \therefore 75b}{c \cdot 09 \therefore 91b}\ \phi = \frac{.25-.09}{\sqrt{(.25+.09)\,(.75+.91)}} = \frac{.16}{.7512} = .213$$

Score for item "actor" in scoring key of occupation =

$$10\,\frac{.213}{(1-.213^2)\,.3756} = 6.$$

Strong regards the score as a mathematical expression of two factors: the extent to which the data in the four-fold table

differentiate between a certain occupation and "men in general" (represented by the numerator of the equation) and the extent to which the data might be the resultant of chance (represented by the denominator of the equation). Because of the essential foundation in Ream's work and the important contributions of both Cowdery and Strong to the scoring technique of the standardized inventory this procedure is called here the Ream-Cowdery-Strong scoring method.

OTHER CONTRIBUTIONS. Hubbard (*6*) tried a somewhat different method of scoring in a study of the mechanical interests of boys, which is based upon suggestions made by Dewey, Anderson and Toops.[25] A primary group of 100 boys was selected from scores in mechanical abilities. These scores were secured by combining the results of scores in actual shop operations and scores in a shop operations information test. Hub-

[25] As described by Hubbard (*6*):

The procedure used to determine the new scoring scheme, that is, the significance of the items as predictions of mechanical ability, was an abbreviation of the correlation procedure. It was necessary to determine separately the significance of each letter after each item. To do this an average criterion score was obtained for each of the four letters after each item. The letters were then arranged in ascending order of their average and a line drawn connecting the averages. This line represents the regression of mechanical ability on the answers to each item of interest as y and x axes respectively.

For instance, in the case of chemist, L was crossed out more often by boys with high mechanical ability than were the other letters, that is, the criterion average of boys liking to be chemists was higher than the criterion average of boys disliking, not knowing about, or not caring about being chemists. And the average criterion score for boys disliking to be chemists was lowest, so the order of letters forming the x-axis for chemist was D, U, O, L.

The straight line most closely approximating the broken line between the averages was drawn by eye. The equation of this line, then, is represented by the formula $\frac{y}{x} = \frac{\sigma_y}{\sigma_x} \cdot r$

Let b = the regression coefficient of y on x, or the slope of the straight line. Then

$$b = \frac{\sigma_y}{\sigma_x} \cdot r \quad \text{Solving for r,}$$

$$r = \frac{1}{\sigma_y} (b.\sigma_x)$$

For these data $\frac{1}{\sigma_y}$ is a constant and may therefore be dropped from the calculation if relative rank order of correlations only is desired, because r then is proportional to $(b.\sigma_x)$. That is, that item which has the highest validity in predicting mechanical ability will be the one in which $(b.\sigma x)$ has the greatest magnitude and vice versa. The value obtained is not a true r but indicates the relative size of the r's which would be obtained if the whole process were completed.

bard's "Interest Analysis Blank" was administered to this group and a scoring key for degrees of mechanical interests was made up according to the correspondence between the mechanical abilities scores and the marking of the interests items. The method calls for an averaging of the shop abilities scores of all those marking each symbol of each item in the inventory. These average scores of each of the four symbols were then ranked for each item and given an arbitrary weighting of 0, 1, 2, 3 in the order of their significance as predictors of mechanical abilities. Sixty-three of the most significant items were then selected for the scoring key based upon the values of the regression lines.

Garretson (*5*, 20-38) has worked from the point of view of simplifying the scoring method. His problem was to develop scoring keys for high school pupils showing differences between those technically interested, academically interested, and commercially interested. He used Ream's method in calculating the differences in percentages, and included items in the scoring keys showing two or more times the standard error of the difference. But he has added to this a simple weighting system in which the weighted score is secured by dividing the raw difference by the standard error of its own difference. The nearest whole number is taken as the weighted score.

A TRIAL OF METHODS. Garretson (*5*, 20-38) bases the use of his method upon a comparative trial of several methods of scoring the interest inventory. For this comparison he used a group of 25 technically interested high school pupils and 25 non-technically interested high school pupils from academic and commercial high schools. Scoring keys by four methods:

1. Using Original Percentage Differences between Groups,
2. Ream's Raw Scoring Method,
3. Strong's Weighted Scoring Method,
4. Garretson's Simplified Weighted Scoring Method,

were constructed for 65 items of the author's "Preference Questionnaire." The results of scoring were compared by Kelley's bi-serial correlation technique with the original grouping of the pupils according to criteria (Table X).

TABLE X. COMPARISON OF METHODS OF SCORING INTEREST INVENTORY (GARRETSON)

Percentage Differences	.82 ± .08
Ream's Raw Method	.82 ± .08
Strong's Weighted Method	.74 ± .10
Garretson's Simplified Weighted Method	.82 ± .08

This analysis of methods shows the simpler "weighted" score method to advantage over the more complex "weighted" score method, also the "raw" score method to be equal in value to the "weighted" score method. The trial of method, however, is with a small group and the analysis is limited by other qualifying factors.

"RAW" AND "WEIGHTED" SCORE METHODS. "Weighted" score methods would seem theoretically to be more accurate indicators of interests. Elaborate weighting systems were devised during the early preparation of intelligence tests, only to be discarded in use. The added advantage of the weighting system in the measurement of abilities did not justify the work. But the situation is somewhat different in the measurement of subjective interests. There is an objective criterion of the group differentiating value of the interest, upon which the weight is established. It is possible that the "weighted" score method is necessary in interest measurement, but this should be definitely established because of the enormous labor involved in devising "weighted" scoring keys and in using them after they are prepared.

Jacobsen (7) has compared the "raw" and "weighted" score methods. Using the Minnesota Interest Inventory, she developed scoring keys for men and for women, and a common key to distinguish between superior and inferior students. These keys were devised by Ream's method with one exception. The criterion of inclusion of an item was its presence in the same direction in three groups of freshmen entering the University of Minnesota in 1923, 1924, and 1925. These three keys, which were "raw" scoring keys, included about 100 items in each key that were scored plus 1 or minus 1.

To investigate the value of a "weighted" key the items in these three "raw" scoring keys were assigned weights of two

if they showed a difference of three or more times the probable error of the difference for any of the three class groups. All other items retained the value of plus or minus 1. Another kind of key was prepared by Jacobsen, called a "limited" key, as a further check upon method. This key included only the items which showed a difference of two or more times the probable error of the difference for two or more of the three class groups.

Correlations for a control group of 300 men and 300 women between the interest scores, secured with the various scoring keys, and measures of intelligence (Minnesota College Ability Test) and scholarship (college grades), are shown in the Table (Table XI).

TABLE XI. CORRELATIONS FOR VARIOUS SCORING KEYS (JACOBSEN)

Various Scoring Keys	*Interests vs. Intelligence*		*Interests vs. Scholarship*	
	Men's Sample	*Women's Sample*	*Men's Sample*	*Women's Sample*
Men's "Raw" Key	.21		.30	
Men's "Weighted" Key	.23		.32	
Men's "Limited" Key	.19		.29	
Women's "Raw" Key		.40		.44
Women's "Weighted" Key		.41		.48
Women's "Limited" Key		.36		.39
Common "Raw" Key	.33	.33	.35	.39
Common "Weighted" Key	.34	.56	.35	.40

There is a slight improvement of the correlations for the "weighted" scoring keys over the "raw" scoring keys and over the "limited" scoring keys. This improvement is consistent, but very small. The weighting system as followed by Jacobsen would not seem to justify the added work. Jacobsen used the "raw" scoring keys. However, the weighting system used by Jacobsen was exceedingly limited in comparison with that used by Cowdery or Strong, and entirely different results might be found in a comparison of their weighting systems with the "raw" score system. Also, the comparison here of

the value of these two systems is by means of correlations with abilities which may, or may not, offer a valid comparison.

Strong (*18*) has made a careful analysis of the "raw" and "weighted" scoring methods to see if the additional statistical labor involved in the "weighted" scoring method justifies itself. "Raw" scoring keys were constructed, following Ream's method, and compared with the "weighted" scoring keys for the occupations of lawyer, certified public accountant, and architect (Table XII).

TABLE XII. CORRELATIONS (r) BETWEEN "RAW" AND "WEIGHTED" SCORING KEYS (STRONG)

Comparisons Made	*Lawyers*		*C.P.A.'s*		*Architects*	
Using Total Items in "Raw" Scoring Keys:	*No.*	r	*No.*	r	*No.*	r
"Raw" and "Weighted" Lawyers' Keys	83	.99	45	.97	50	.98
"Raw" and "Weighted" Lawyers' Keys	190	.98	..	..	..	..
"Raw" and "Weighted" C.P.A.'s' Keys	83	.87	45	.96	50	.94
"Raw" and "Weighted" C.P.A.'s' Keys	..	..	90	.96	..	..
"Raw" and "Weighted" Architects' Keys	83	.89	45	.84	50	.91
"Raw" and "Weighted" Architects' Keys	..	..	..	..	103	.91
Using Only "Odd" Items in "Raw" Scoring Keys:						
"Raw" and "Weighted" Lawyers' Keys	83	.96	45	.92	50	.94
"Raw" and "Weighted" C.P.A.'s' Keys	83	.80	45	.88	50	.82
"Raw" and "Weighted" Architects' Keys	83	.82	45	.70	50	.78

The average for the correlations between "total item" raw scoring keys and the weighted scoring keys is .93 and between the "odd item" raw scoring keys and the weighted keys it is .85, indicating the close agreement between the "raw" and "weighted" scoring methods. The reliability is computed by Strong (Brown formula) of the "weighted" scoring method as .80 (mean coefficient) and of the "raw" scoring method as .84 (mean coefficient).

Based upon these figures, says Strong, one would naturally conclude that the "raw" scoring method might be used instead of the "weighted" scoring method. But scoring keys devised by this method were found to be less effective in their practical application. In seven comparisons made by Strong (*18*)

for the groups of 83 lawyers, 45 certified public accountants, 50 architects, and 58 journalists, who were scored by the "raw" and "weighted" scoring keys for law, architecture, journalism and accounting, it was found that twice as many men were rated as not belonging to an occupational group to which they do not belong, when the "weighted" keys are used as when "raw" keys are used and that overlapping of groups is increased more than three times by the use of "raw" keys in contrast with the "weighted" keys. For these practical reasons Strong has continued to use the more laborious technique of devising scoring keys by the "weighted" score method." [26]

Strong (*18*) is working upon other modifications of scoring technique. It is thought possible to eliminate the "indifference" symbol of the inventory from the scoring key. A preliminary experiment shows that the separation of occupational groups was increased in four cases and decreased in four others where the use of this symbol was eliminated.

Certain of the weights which have been used by Strong in scoring keys are as high as +30 and −30. Strong is now reducing all weights to a total of plus and minus 15. Cowdery's weights were in similar proportions. Rosenstein and Birnberg are experimenting at the University of Minnesota with weights ranging from 1 to 9. The problems of weights is still an unsolved one in the field of interest measurement.

SUMMARY. In this chapter the historical development of a standardized interest inventory has been traced from its beginnings in the seminar of Clarence S. Yoakum at the Carnegie Institute of Technology in 1919 to the latest development of an inventory used to measure interests, prepared by Strong and Garretson about ten years later. Paralleling this development of a standardized interest inventory is the development of scoring technique. A method has been developed whereby scoring keys of group interests can now be based upon objective criteria of group differences in interests. The following chapter will present some of the research upon the de-

[26] Strong has prepared a chart giving all of the weights for combinations of percentages which obviates the necessity of working out the weight for each item in any scoring key.

velopment of scoring keys and the process of distinguishing between social groups by their scoring keys.

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CHAPTER IV

GROUP INTERESTS

PSYCHOLOGICAL measurement, in its work of devising measures of personality has proceeded upon various assumptions. The makers of intelligence tests assume that there are differences in degrees of the human abilities which all people possess and that these abilities can be measured in various combinations showing a distribution for all people. The users of interest inventories have made a different assumption. They have assumed that people differ by groups, that subjective interest differences are social group differences, and the search has been for the existence of interests which distinguished groups of people. The scoring technique of the standardized interest inventories leads to a group score, a score of degrees of group interests.

THE ATTEMPT TO SEPARATE SOCIAL AND MECHANICAL GROUPS BY THEIR INTERESTS. Following Moore's early experiment in contrasting the mechanically interested design engineers and the socially interested sales engineers, Freyd applied the 1921 edition of The Carnegie Interest Inventory to the study of the distinguishing interests of the mechanically and socially interested. (*3, 4, 5*) He selected two primary groups, one of twenty-nine individuals judged to be socially interested, and the second of thirty individuals judged to be mechanically interested. These individuals were salesmen and engineers by occupation. Freyd planned to distinguish between these groups by the items each group liked or disliked and to devise a scoring key for the inventory to distinguish between those with social and mechanical interests. Ream's scoring method with slight modification was used in devising the scoring key. The inventories were administered to the two groups. Each item in the inventory was compared for differences in proportions between the two groups of those marking the symbols "L", "?", and

"D". The markings of the extreme likes and dislikes were not tabulated separately. Those markings which showed a significant difference between the social-interest group and the mechanical-interest group were selected, and the difference between the two percentages was determined. The standard error of the difference was next secured by Yule's formula. Where the difference in per cent of cases marking an item was at least twice as great as the standard error of the difference, the item with its marking was listed as an item of social interest or an item of mechanical interest, according to which way the proportions were, and given a score of +1 and —1 respectively. The scoring method has been described in detail in Chapter III.

Social interests in the occupational section of the Carnegie Inventory were found to be *to like* actor, magazine writer, preacher, specialty salesman, and *to dislike* factory manager, machinist, ship officer, shop foreman, toolmaker. Social interests in the general section of the inventory were found to be *to like* fat men, "Life," interviews, and *to be indifferent to* very polite people, "The New Republic." These items were scored +1. Occupational mechanical interests, scored —1, were found to be *to like* astronomer, draftsman, factory manager, locomotive engineer, machinist, ship officer, shop foreman, toolmaker, watchmaker, and *to dislike* magazine writer. General mechanical interests, scored —1, were found to be *to like* very polite people, "The New Republic," *to be indifferent to* "Life," and *to dislike* fat men, conventions, interviews.[1] Nine of the seventy-two occupational items and five of the one hundred and twenty-six general items denote social interests. Ten of the occupational items and six of the general items denote mechanical interests.

This list of distinguishing interests formed a scoring key which was used to score the inventories of the individuals making up the primary groups. The discrimination between the social-interest group and the mechanical-interest group is found to be almost complete. There is an overlapping of the two distributions in only three cases. This is shown in the

1 This list of social and mechanical interests forms Freyd's Social-Mechanical Interest Scoring Key for use with the 1921 edition of the Carnegie Interest Inventory or the later forms where only slight changes are made in the list of items.

figure (Fig. 3), where the crosses denote the mechanically interested men and the eggs the socially interested men. The scores in the inventories secured by use of the key are given in minus quantities for the mechanically interested men and in plus quantities for the socially interested men.

Ninety per cent of the primary group with mechanical interests and ninety-three per cent of the primary group with social interests, considering the zero score as a neutral zone, are distinguished by Freyd's Social-Mechanical Interest Scoring Key. There is suggested for the scoring key a high degree of dis-

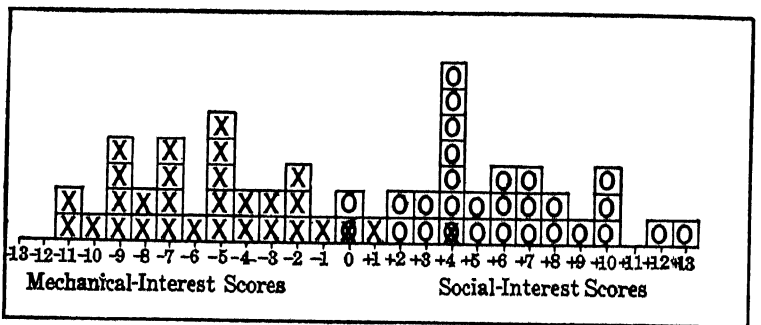

Figure 3. Freyd's Primary Groups of 30 mechanically interested men and 29 socially interested men, used in devising the scoring key. Distribution according to scores in Carnegie Interest Inventory: x = one mechanically interested man; o = one socially interested man (after Freyd).

crimination when it is applied to other groups than those upon which the scoring key was devised.

VALIDATING FREYD'S SOCIAL-MECHANICAL INTEREST SCORING KEY. A necessary step is to validate the scoring key. The question must be answered, "Will this scoring key of mechanical interests and social interests distinguish between other mechanically and socially interested individuals than these upon whom it was devised?" The scoring key would be expected to distinguish between those in the primary social-interest and mechanical-interest groups because these groups would have some distinguishing interests. The scoring key is made up of these distinguishing interests. But are these distinguishing social and mechanical interests in the scoring key the interests which are found in all socially and mechanically interested groups, if such groups exist? If they are common interests of

these groups it would be expected that the scoring key would distinguish between other individuals by their social and mechanical interests. If not distinguishing social and mechanical interests of all individuals, the scoring key will not work, or, it will only work to the extent the items are common interests of socially and mechanically interested individuals.

Freyd's control groups (5), which were used to test out the scoring key, were composed of fifteen college students in industries and eighty mechanical and commercial engineers, forming the mechanical-interest group of ninety-five, and one hundred

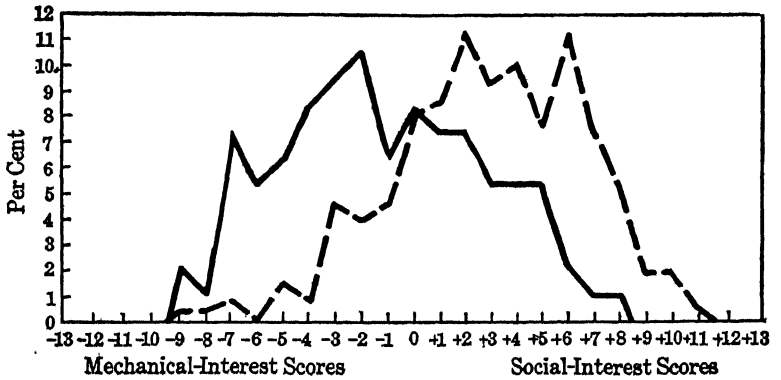

Figure 4. Freyd's Control Groups of 95 mechanically interested and 259 socially interested persons, used to validate the scoring key. Percentage distribution according to scores in interest inventory. Broken line represents socially interested (salesmen) and continuous line mechanically interested (engineers).

and fifty-one insurance salesmen students and one hundred and seven real estate, bond, and adding machine salesmen, forming the social-interest group of two hundred and fifty-nine. The same Carnegie Inventory was administered to the control groups and scored with Freyd's Social-Mechanical Interest Scoring Key. The distribution is shown in the figure (Figure 4), where the broken line represents the social-interest group of salesmen, and the continuous line the mechanical-interest group of engineers. Scores in the inventory are given on the abscissa (base line) in minus quantities for mechanical interests and in plus quantities for social interests. The per cent of the group found for any one score is shown at the left upon the ordinate (upright).

Considering zero as a neutral zone, which includes 8.4% of the mechanical-interest control group and 8.1% of the social-interest control group, there are distinguished from each other the following per cents (Records of Primary Groups included):

Groups Distinguished	*Records of Primary Groups*	*Records of Control Groups*
Mechanical-interest group	90	56.8
Social-interest group	93	74.8

The per cent of discrimination, allowing for errors in the selection of representative groups, is not nearly so great with the control groups as with the primary groups upon which Freyd's Social-Mechanical Interest Scoring Key was devised. Evidently the scoring key includes many interests peculiar to the primary groups, as well as some universal interests of social and mechanical groups in general.

Further validation of Freyd's Social-Mechanical Interest Scoring Key has been attempted by Hubbard at the University of Minnesota. (*8*) Social-mechanical interest scores were secured with the Minnesota Inventory for over 1,000 college students. Engineering students are used to represent the mechanically-interested, law students the socially-interested, and science, literature, art and business students the mixed groups. A comparison of median scores of the several groups (Table XIII) will indicate the distinguishing of groups by Freyd's Social-Mechanical Interest Scoring Key. Where these median scores are close to zero, the social and mechanical interests are about equal, as found among many of the Arts and Business students. The middle sixty-eight per cent (two standard deviations) indicate the overlapping of the distribution of scores for the several groups.

TABLE XIII. HUBBARD'S AND FREYD'S CONTROL GROUPS FOR VALIDATION OF FREYD'S SOCIAL-MECHANICAL INTEREST SCORING KEY
(Groups from Hubbard's study unless otherwise indicated)

Groups	*Number*	*Median Score*	*Middle 68%*
Freyd's Engineers (control group)	95	—2.05	—4.66 to +2.68
Freshman Engineers	277	—3.00	—6.57 to + .57
Senior Engineers	158	—1.27	—5.55 to +3.01

Groups	Number	Median Score	Middle 68%
Freshman Science, Literature, and Arts Men	365	+ .81	—2.64 to +4.26
Pre-Business Students	84	+1.16	—2.12 to +4.44
Freshman Science, Literature, and Arts Women	114	+2.3	— .92 to +5.52
First Year Law Students	101	+2.07	—1.39 to +5.53
Freyd's Salesmen (control group)	259	+3.56	+1.00 to +6.31

The distribution of Hubbard's significant groups, the engineers and law students, is shown in figure 5. There is lack of

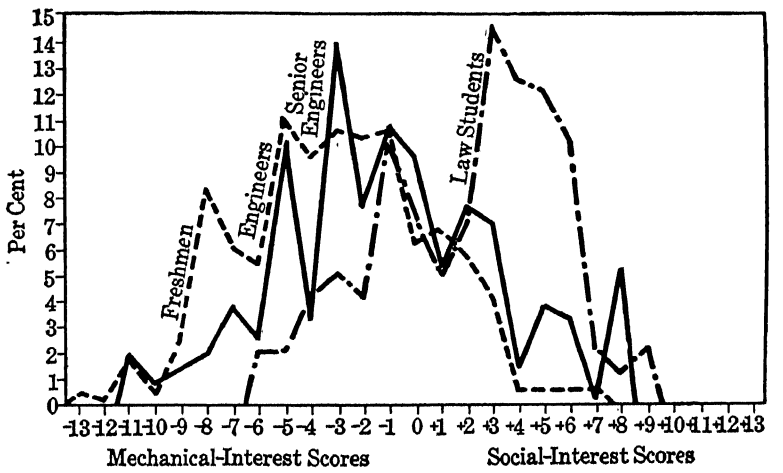

Figure 5. Hubbard's Significant Groups. Percentage distribution according to scores in interest inventory. Broken line represents socially interested (law students) and continuous line mechanically interested (engineers).

agreement for the results of the two groups of Arts students, and the suggestion of sex differences, so that these groups appear non-significant from the viewpoint of having the social or mechanical interests of the scoring key. Scores in the inventory are given on the abscissa in minus quantities for mechanical interests, and in plus quantities for social interests. The per cent of the group found for any one score is shown on the ordinate.

An overlapping similar to that of Freyd's control groups was found for the curves of the engineers selected by Hubbard to represent mechanical interests, and of the law students

selected to represent social interests. Using zero as a neutral zone (which includes 6.1% freshman engineers and 9.5% senior engineers and 7% law students) a percentage of the groups is distinguished from each other as shown below.

Groups Distinguished			
	Social-Interest Groups	Freyd's Salesmen (control group)	75%
		Hubbard's Law Students	66%
		Average—71% (Mean and Median)	
	Mechanical-Interest Groups	Freyd's Engineers (control group)	57%
		Hubbard's Freshman Engineers	76%
		Hubbard's Senior Engineers	58%
		Average—64% (Mean) 58% (Median)	

THE PREDICTIVE VALUE OF FREYD'S SCORING KEY. A summary of the investigations testing out Freyd's Social-Mechanical Interest Scoring Key is given in Figure 6. Here

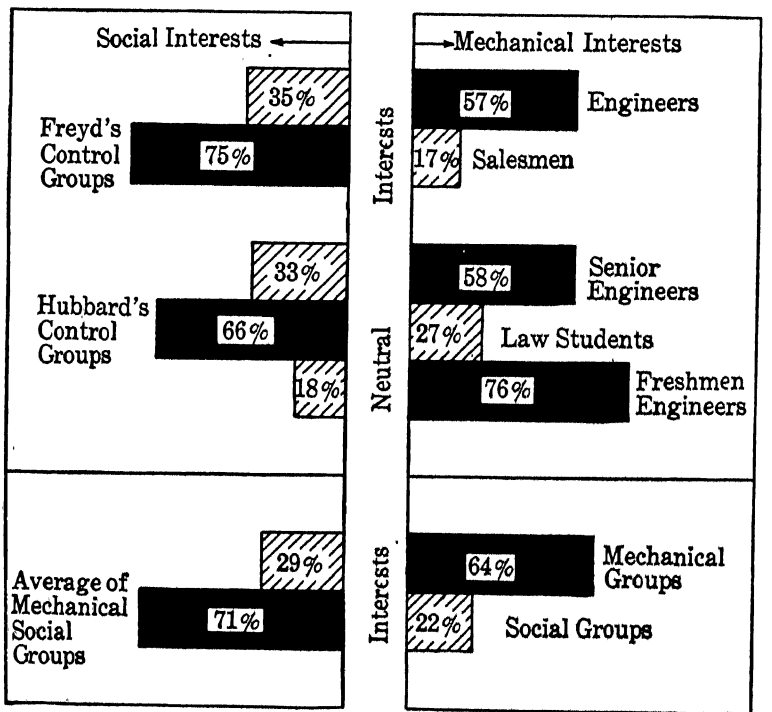

Figure 6. Differentiation of groups by Freyd's Social-Mechanical Interest Scoring Key. Correct selections in black, incorrect in white. Per cents at left of center line show social interests. Per cents at right show mechanical interests. Per cent of neutral interests not shown.

are shown the overlapping of Freyd's control groups, of the significant groups of Hubbard's study, and also, the average (mean) of the social-mechanical interest groups at the bottom.

In Freyd's control group, 75 per cent of the salesmen are selected for social interests and 57 per cent of the engineers for mechanical interests. There is a correct separation of 66 per cent of these two specialized groups which is raised to 74 per cent if half of those with neutral interests are included. According to these figures there are 66 chances (or 74 chances) in one hundred of separating these two specialized groups when there is a guessing basis of 50 chances in one hundred. For purposes of selection, however, where one interest group must be separated from another or from several others as is usually the case, the number of errors made becomes of practical importance. Along with the 57 per cent of the engineers selected as having mechanical interests 17 per cent of the salesmen get included. With the 75 per cent of the salesmen selected as having social interests 35 per cent of the engineers get caught in the wrong net. The predictive value of the scoring key is interpreted as the number of correct selections minus the errors. Figuring either way there are 40 chances in a hundred that correct selections will be made from a group composed of individuals with two kinds of interests. For Hubbard's groups the situation is much the same. Using the freshmen engineers and law-students there is a correct separation of 71 per cent of the two groups (77 per cent correct, if half of those with neutral interests are included). Using the senior engineers and the law students there is a correct separation of 62 per cent of the two groups (70 per cent correct, if half those with neutral interests are included in the figure). Subtracting the errors from the correct selections, there are 49 chances in one hundred for correct selection of one interest group (when freshmen engineers are used) and 42 chances in one hundred when senior engineers are used.

The discrimination of groups when the percentage results for the groups of social and of mechanical interests are averaged is shown at the bottom of Figure 6. There is a correct separation of 67.5 per cent of the two groups, and if half of those with neutral interests are included, a separation of 74.5

per cent. But if it is desired that one group be separated from the combined group of socially and mechanically interested individuals there are just 42 chances in one hundred of doing so, subtracting errors from correct selections. Of course, there is the possibility that individuals in the social groups who score high in mechanical interests, or *vice versa,* really do not belong in the interest group which they have chosen.

THE RELIABILITY OF FREYD'S SCORING KEY. Hubbard (*10*) has determined the reliability of Freyd's Social-Mechanical Interest Scoring Key by correlating the scores for the odd items with the even items, and correcting by Brown's formula, for 365 Science, Literature and Arts freshmen men in the University of Minnesota. This reliability coefficient of .33 indicated a low reliability for the scoring key.

SOCIAL AND MECHANICAL GROUPS DISTINGUISHED BY THEIR INTERESTS. The conclusion might be drawn from the investigations of Freyd and Hubbard that social and mechanical interests are not clearly defined in groups of people. However, it may be that these interests were not present in the inventory, but that distinguishing social group interests and distinguishing mechanical group interests do exist in the mental activity of people. There is a third possibility that the scoring key, devised upon the interests of the primary groups of 29 and 30 persons by Freyd, was formed of interests distinguishing the individuals of these two groups but not of social and mechanical groups generally.

Hubbard (*9*) has developed a new scoring key of social-mechanical interests, the use of which may throw some light upon this problem. She administered her "Interest Analysis" to a group of 150 seventh-grade boys. Her primary group for developing the scoring key was composed of 38 of these boys who were superior and 38 who were inferior in the Minnesota Mechanical Abilities Tests. This is an ability criterion rather than an interest criterion for the selection of the primary social and mechanical groups. Ream's method was used in developing the scoring key. Social interests in the occupational section of the inventory were found to be *to like* auto salesman, dairyman, employment manager, singer; to mark *un-*

known civil engineer; to be *indifferent* to dentist, labor arbitrator; to *dislike* hunter and trapper, locomotive engineer, lumberman: a total of ten significant social interests. Social interests in the general section of the inventory were found to be to *dislike* arithmetic, general science, fat men, energetic people: a total of four. These items were scored +1. Mechanical interests in the occupational section of the inventory were found to be *to like* bookkeeper, chemist, civil engineer, mining engineer; to mark *unknown* consul; to be *indifferent* to auto salesman, business man, toolmaker, Y.M.C.A. secretary; to *dislike* druggist, newspaper reporter, office clerk, specialty salesman: thirteen significant mechanical interests. Mechanical interests in the general section of the inventory were found to be *to like* arithmetic, fat men; to mark *unknown* quiet people, meeting new people; to be *indifferent* to physiology, talkative people, very polite people, riding a bicycle, helping in the house, cutting the grass, going to the movies: a total of eleven.[2] These items were scored —1. The score of an individual in the inventory was recorded as the algebraic sum of the positive and negative values. Positive scores denoted social interests and negative scores mechanical interests.

There is a total of 14 social interests and 24 mechanical interests in Hubbard's Social-Mechanical Interest Scoring Key. There is a total of 14 social interests and 16 mechanical in Freyd's Social-Mechanical Interest Scoring Key. Are they the same? The answer is that none are the same! In one scoring key the item "fat men" is liked and in the other disliked by the mechanical group. There is no correspondence between the scoring keys. But there are explanations for this. The inventories used for the two primary groups upon which the scoring keys were devised were different. On the other hand there were many common items in the two inventories. There is another more important criticism. The criterion of social and mechanical interests used by Freyd in securing his primary group upon which to devise a scoring key was a definite job of

[2] This list of social and mechanical interests forms Hubbard's preliminary Social-Mechanical Interest Scoring Key, which was used in her research upon mechanical interests.

work or study in a social or mechanical occupational field. Hubbard's criterion was scores in a group of mechanical abilities tests. Hubbard would appear to be selecting items for the scoring key indicating a high degree and a low degree of mechanical abilities. Also, the fact that Freyd's work is done upon adults and Hubbard's upon boys would have something to do with the results.

However, the lack of any correspondence between these two scoring keys does raise the question of the existence of distinguishing social and mechanical interests. While such interests may be present in highly specialized occupational groups, such as those studied by Moore, Freyd and Hubbard, we have today no assurance that these groups can be satisfactorily isolated by their social and mechanical interests alone. The assumption of some investigators, that all persons can be divided into mechanical and social groups, according to their interests, is not borne out by these researches.

BINGHAM'S THEORY OF INTROVERTED AND EXTROVERTED INTERESTS. Bingham (*1*) has advanced a theory of introverted and extroverted interests which may prove to be an answer to this difficulty. According to Bingham's theory the social and the mechanical interest groups correspond to a normal distribution of introvert and extrovert interests. The social interests are at the extroverted extreme and the mechanical interests are at the introverted extreme. Another group of introverted interests are the intellectual. This theory would allow for some distinguishing social group interests and some distinguishing mechanical group interests, which are those of the extremes of the distribution of all people. It would also allow for many non-distinguishing social and mechanical interests, more or less common property, of those about the average. This would divide all people into two groups in degrees of social interests and mechanical interests, but with very little discrimination for the large group clustered at the center of the distribution.

The "Colgate Mental Hygiene Inventory" of introversion-extroversion has been applied to the study of interests to see if introverted scores show intellectual and mechanical interests and extroverted scores social interests. In a study of vocational

choices of college students (*16*) Steen and Estabrooks find no indication that business men, who might be considered to be socially interested, and professional men, who might be considered to be intellectually interested, tend to make either introverted or extroverted scores. When one group of 80 Colgate University alumni, who had been given the Colgate Inventory while in college, was investigated in 1927, 44 were found to be engaged in professional work and 36 in business. The difference between the two groups' average scores in the inventory was .4 and the P.E. of the difference, 3.86. A classification of vocational choices of 139 freshmen was made into a professional group and a business group. The average scores in the inventory for these two groups showed a difference of .5, with the P.E. of the difference at 4.20. Though the differences are insignificant in both studies there is an extroversion difference in favor of the social groups. A third study of ministers, representing extroversion, and engineers, representing introversion, is said to show no relation between introversion and vocational choice.

In a study of the educational choices of 60 students at Colgate University (*17*) Steen and Estabrooks find no definite indication that school subjects in general, or any school subject, excepting possibly philosophy and zoology, are liked better by introverted than by extroverted students. Section III of the Strong Vocational Interest Blank, which is composed of 39 school subjects, was administered to these students along with the Colgate Mental Hygiene Inventory, testing introversion-extroversion. The average score in the mental hygiene inventory was computed for those who liked a school subject and for those who disliked the subject. In general, these averages were about the same but there is just a slight suggestion here, as in the study of vocational interests, supporting Bingham's theory that there are introverted and extroverted interests.

The problem of social and mechanical mindedness, as far as interests are concerned, must be left with this inconclusive evidence supporting almost any of the possibilities mentioned above, according to the point of view of the investigator.

men and engineers) above the critical score taken as +50. The score range for lawyers is from —13 to 333 and for non-lawyers —333 to 163. The inventory distinguishes ninety-seven per cent of the lawyers from ninety-six per cent of the non-lawyers. These distinguishing scores may be seen graphically in figure 7.

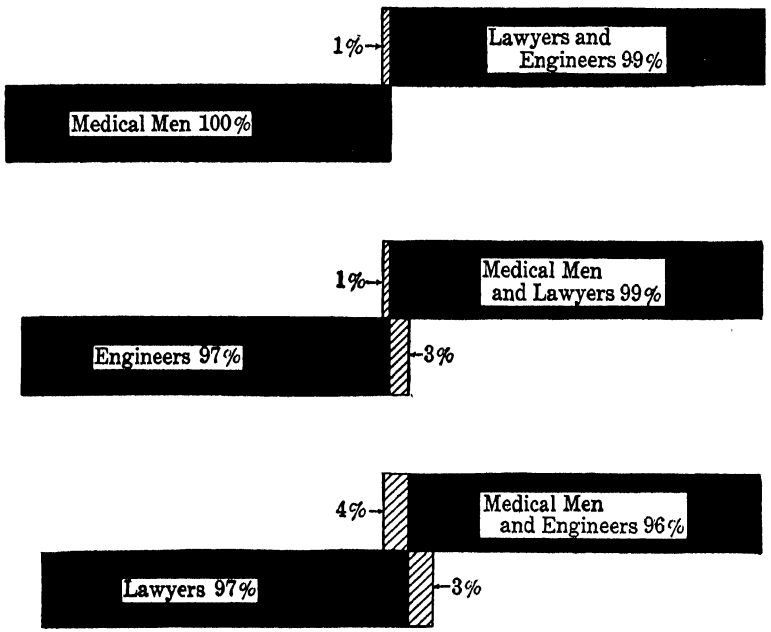

Figure 7. Cowdery's Primary Groups of 34 medical men, 37 engineers, and 34 lawyers, showing the per cent distinguished of the members of one profession from the members of the other two professions by a scoring key of that profession.

VALIDATING COWDERY'S PROFESSIONAL SCORING KEYS. In the validation of his professional scoring keys for medical men, engineers and lawyers, Cowdery administered the inventory to several control groups, totaling 427 individuals, including 172 professional practitioners and 254 students engaged in either professional or pre-professional training in medicine, engineering, and law. The characteristic distinguishing interests are found to exist among these new professional groups. The groups of university students gave results similar to the professional practitioners. The average (mean) scores of the three professional groups and the extremes of the middle sixty-

eight per cent of the groups (two standard deviations) which were found through the use of the medical, engineering, and legal scoring keys, is given in the following table (Table XIV):

TABLE XIV. COWDERY'S CONTROL GROUPS. DISTRIBUTION OF SCORES FOR GROUPS (AT LEFT) WHEN SCORED WITH PROFESSIONAL SCORING KEYS

	I *Medical Men Scoring Key*		II *Engineers Scoring Key*		III *Lawyers Scoring Key*	
	Mean	*Middle 68%*	*Mean*	*Middle 68%*	*Mean*	*Middle 68%*
Medical Students and Medical Men	+51.1	+7.7 to +94.5	—25.9	—107.5 to +55.7	—14.7	—106.0 to +76.6
Engineering Students and Engineers	—46.4	—116.0 to +23.2	+130.1	+44.2 to +216.0	—88.3	—178.9 to +2.3
Law Students and Lawyers..	—53.3	—101.6 to —5.0	—59.4	—141.6 to +22.8	+119.2	+37.6 to +200.8

The table should be read downward for the different groups distinguished by each of the professional scoring keys. The middle sixty-eight per cent indicates the extent to which the group to be distinguished is overlapped by the groups from which it is to be distinguished. For example, the range of the middle 68 per cent of the medical group is from +7.7 to +94.5. The only non-medical group, scored by the medical men's scoring key, overlapping this middle group is the engineering group which extends into the lower ranges of the medical group to +23.2.

The critical scores established by Cowdery upon his primary group were 32 for the medical men, 100 for the engineers, and 50 for the lawyers. These critical scores were found not to differentiate to a high degree the members of the profession being scored from the members of the other two professions.

But new critical scores were chosen which distinguished, for their respective professional scoring keys,

87 per cent of the medical men from 83.8 per cent of the lawyers and engineers

83.7 per cent of the engineers from 88.9 per cent of the medical men and lawyers

85.7 per cent of the lawyers from 75.1 per cent of the medical men and engineers

The new critical scores were zero for the medical men's scoring key, 50 for the engineers' scoring key, and 25 for the lawyers' scoring key, which were found to be equally effective upon four distinct groups: professional practitioners, graduate students, upper division pre-professional students, and lower division pre-professional students. These facts are shown graphically in Fig. 8.

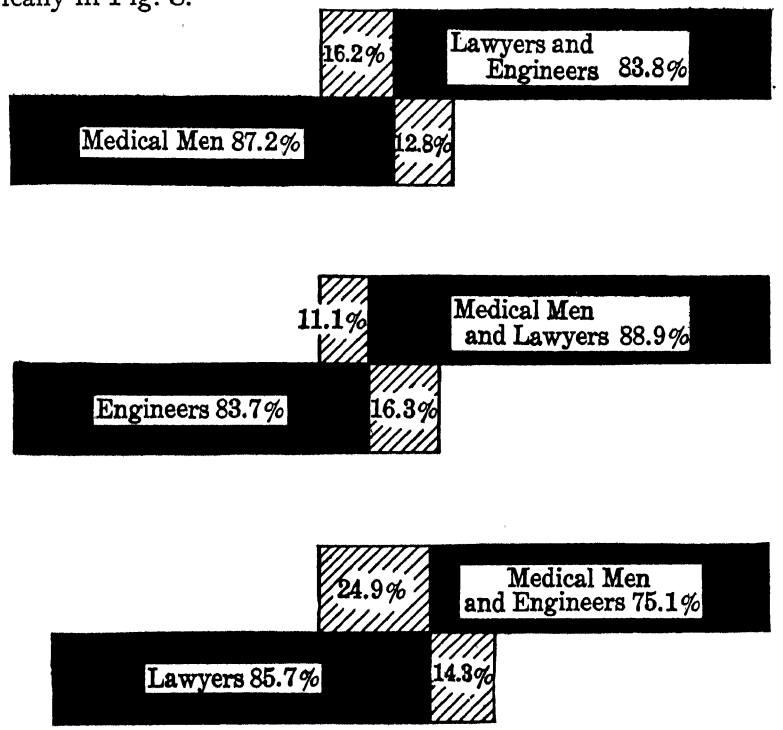

Figure 8. Cowdery's Control Groups for validating his professional scoring keys for medical men, engineers, and lawyers, showing the per cent distinguished of the members of one profession from the members of the other two professions by a scoring key of that profession (after Cowdery).

THE PREDICTIVE VALUE OF COWDERY'S SCORING KEYS. Cowdery's scoring keys have a high selective value in comparison with the previous investigations into groups interests, but for practical purposes the number of incorrect selections must be taken into consideration. With the correct selections for each occupational group there are also included a number who do not belong there, being drawn from the other two occupational groups. Subtracting the wrong from the right selections, we find the medical men distinguished from the other two professions to the extent of 71 per cent. There is prediction for selection by the medical men's scoring key of 71 chances in 100. The engineers are distinguished from the other two professions, subtracting the errors from the correct selections, to the extent of 72.6 per cent. There is prediction for the engineers' scoring key of 73 chances in 100. The lawyers are distinguished from the other two professions, subtracting the errors from correct selections, to the extent of 60.8 per cent. There is prediction for the lawyers' scoring key of 61 chances in 100.

THE RELIABILITY OF COWDERY'S SCORING KEYS. The reliability of Cowdery's professional scoring keys has been calculated by computing the correlation coefficient (Table XV) between the scores secured from the odd-numbered items and the scores from the even-numbered items, corrected by applying the Spearman-Brown formula, for several groups of practitioners and students interested in these professions, a total of 835 individuals. (*2*)

TABLE XV. COEFFICIENTS OF RELIABILITY FOR COWDERY'S PROFESSIONAL SCORING KEYS (COWDERY)

Groups	*Legal Scoring Key*	*Engineering Scoring Key*	*Medical Scoring Key*
Experienced Practitioners	.91 ± .01	.80 ± .03	.78 ± .03
Graduate Students	.85 ± .02	.83 ± .02	.78 ± .02
Upper Division, University Students	.81 ± .02	.79 ± .03	.79 ± .02
Lower Division, University Students	.78 ± .03	.66 ± .04	.69 ± .04
High School Senior Boys	.84 ± .03	.84 ± .03	.70 ± .05

These coefficients indicate a fair reliability for Cowdery's professional scoring keys.

PROFESSIONAL RATINGS FOR USE WITH COWDERY'S SCORING KEYS. Cowdery introduced a professional rating for use in the interpretation of the scores secured in scoring the inventory for lawyer's interests, medical men's interests and engineer's interests. (*2*) The critical scores are given a zero professional rating. Positive professional ratings, those above zero, offer in degrees higher predictive chances of correct selection of the particular profession. Negative professional ratings, those below zero offer in degree a rating of non-professional interests. The average professional rating for each of the three professions is +25, which corresponds to the average (mean) score in professional interests. In this manner a uniform scale was introduced into interest measurement. Cowdery's Professional Interest Ratings are given in Table XVI.

TABLE XVI. PROFESSIONAL INTEREST RATINGS (COWDERY)
For Use with Cowdery's Interest Report Blank and Cowdery's Professional Scoring Keys

Professional Rating	*Scores in Medical Men's Scoring Key*	*Scores in Engineers' Scoring Key*	*Scores in Lawyers' Scoring Key*
75	145 to 154	282 to 297	258 to 273
70	135 to 144	266 to 281	242 to 257
65	125 to 134	250 to 265	226 to 241
60	115 to 124	234 to 249	210 to 225
55	105 to 114	218 to 233	194 to 209
50	95 to 104	202 to 217	178 to 193
45	85 to 94	186 to 201	162 to 177
40	75 to 84	170 to 185	146 to 161
35	65 to 74	154 to 169	130 to 145
30	55 to 64	138 to 153	114 to 129
25	45 to 54	122 to 137	98 to 113
20	35 to 44	106 to 121	82 to 97
15	25 to 34	90 to 105	66 to 81
10	15 to 24	74 to 89	50 to 65
5	5 to 14	58 to 73	34 to 49
0	—8 to 4	41 to 57	13 to 33

Professional Rating	*Scores in Medical Men's Scoring Key*	*Scores in Engineers' Scoring Key*	*Scores in Lawyers' Scoring Key*
—5	—23 to —9	21 to 40	—12 to 12
—10	—38 to —24	1 to 20	—37 to —14
—15	—53 to —39	—19 to 0	—62 to —38
—20	—68 to —54	—39 to —20	—87 to —63
—25	—83 to —69	—59 to —40	—112 to —88
—30	—98 to —84	—79 to —60	—137 to —113
—35	—113 to —99	—99 to —80	—162 to —138
—40	—128 to —114	—119 to —100	—187 to —163
—45	—143 to —129	—139 to —120	—212 to —188
—50	—158 to —144	—159 to —140	—237 to —213
—55	—173 to —159	—179 to —160	—262 to —238
—60	—188 to —174	—199 to —180	—287 to —263
—65	—203 to —189	—219 to —200	—312 to —288
—70	—218 to —204	—239 to —220	—337 to —313
—75	—233 to —219	—259 to —240	—362 to —338
Mean Score ..	49.7	125.4	108.9
Critical Score..	0	50	25

SEPARATING AGRICULTURAL AND ENGINEERING STUDENTS BY THEIR INTERESTS. Using the "Purdue Interest Report Blank," Remmers (*15*) worked upon the problem of distinguishing between two professional groups of college students, engineering and agricultural freshmen, by their interests. He made a random selection of 200 agricultural students and 100 engineering students for his primary group. He used Ream's method for sorting out the significant items distinguishing between the two groups and usually included those items in his scoring key which were three or more times the probable error of the difference between the per cents of the two groups liking or disliking the item. The items indicating engineering interests were marked plus and the items indicating agricultural interests were marked minus. The score for an individual was the algebraic sum of these values.

Average scores are given (Table XVII) for 112 agricultural freshmen, 106 engineering freshmen and 23 agricultural seniors, all selected at random. It is not stated whether or not

any of these subjects belong to the primary group upon which the scoring key was devised.

TABLE XVII. SCORES OF CENTRAL TENDENCY FOR OCCUPATIONAL GROUPS (REMMERS)

	Median	*Mean*
112 Agricultural Freshmen	—22.53	—21.25
106 Engineering Freshmen	+14.33	+13.44
23 Agricultural Seniors	—17.20	.....

No score in one freshman group overlaps the average (mean) score of the other group. Seven per cent of the engineering freshmen overlap a critical point chosen in the distribution of agricultural freshmen and 4 per cent of the agricultural freshmen overlap a corresponding point in the distribution of the engineering freshmen. The selection of one group from the other is accurate to the extent of 90 per cent or is better than a 50-50 guessing basis, by 40 per cent. Remmers has calculated the reliability of his scoring key distinguishing agricultural and engineering students as .84 ± .014 by correlating the scores for odd and even numbered items and correcting with the Spearman-Brown formula.

THE EXISTENCE OF OCCUPATIONAL GROUP INTERESTS. Occupational group interests, interests distinguishing individuals in one occupational group from those in another, appear to exist. This is the conclusion suggested from both Cowdery's and Remmers' investigations. However, Cowdery worked only with three professional groups and the distinguishing occupational interests are those that distinguish one profession from the two others. Remmers' work is on an even simpler basis.

This is probably not the same thing as distinguishing one occupation from all other occupations, from lawyer to peddler. It would seem that there are occupational interests for some occupational groups, which distinguish the individuals of these

groups from all others. But we must await evidence. However, this work of Cowdery and Remmers suggests that occupational group interests do exist, in the professions and possibly in other occupational groupings.

THE WORK OF E. K. STRONG, JR. Strong has assumed the larger task of distinguishing an occupation by the common interests of that group, from all other occupations. He used Cowdery's inventory in his preliminary experiment and administered it to a sample of 18 occupational groups, totaling 1,271 individuals, as follows:

49 advertising men	78 lawyers
63 artists	92 life insurance salesmen
90 authors	100 ministers
73 bankers	47 office workers
100 certified public accountants	48 personnel men
60 department store salesmen	96 medical men
73 engineers	76 retail salesmen
72 executives	26 service station employees
57 Fuller brush salesmen	66 school teachers

Using the Ream-Cowdery-Strong scoring method, described in Chapter III, scoring keys were devised for each of these primary occupational groups. The occupational groups were contrasted, in making the scoring key, with a group of "men in general" composed of the remaining occupational groups for which a scoring key was not being prepared at the moment.[4]

PERSONNEL MEN. Working with personnel men (*18, 19*) the scoring key was devised by contrasting the interests of the 48 individuals in this primary group with a general group of 592 non-personnel men representing 12 of the above professions: lawyers, advertising men, line executives, ministers, life insurance salesmen, school teachers, engineers, certified public accountants, office workers, department store salesmen, bankers, artists. The interest inventories of the individuals making up these groups were then scored with the personnel men's scoring key and the scores distributed as in the figure (Figure 9, p. 123).

The scores for personnel men range from 45 to 285. The

[4] These eighteen occupational scoring keys have been used by Strong as the critical basis in the formation of new scoring keys made with a new sample of occupational groups to which was administered Strong's new inventory, the "Vocational Interest Blank."

scores of the general group of 592 non-personnel men range from —175 to 225. There is an overlapping by the general group of 28.3 per cent. Seventy-one and seven-tenths per cent of the personnel men are distinguished from the non-personnel men, which is 72 chances in 100 of selecting personnel men from non-personnel.

Different occupational groups making up the general group are found to have different degrees of personnel interests when their inventories are separated out from the general group. While all the non-personnel are like personnel men only to the

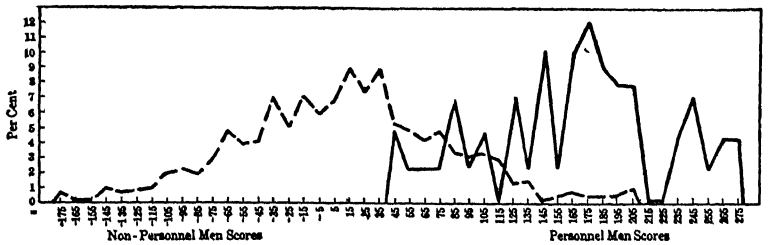

Figure 9. Distribution of scores of personnel men and general group of non-personnel men, scored for personnel men's interests (after Strong.)

extent of 28.3 per cent, lawyers and advertising men are like personnel men in their interests to the extent of about 45 per cent. The per cent that thirteen occupational groups are like personnel men in their interests is shown in the first column in the table (Table XVIII). The extent to which non-personnel men have the same interests as the 75 per cent of personnel men who scored highest in personnel interests is shown in the column at the right. These are the percentages of individuals in other occupational groups making scores within the range of scores of personnel men (first column) and within the range of scores of the 75 per cent of the highest scoring personnel men (second column). (See table on p. 124.)

If the score of 45, the lowest score in the personnel men's distribution, is taken as the critical score, the individuals in the occupational groups at the left, when scored for personnel interests, would be expected to have personnel interests to the extent shown in the first column of per cents. In selecting personnel men from lawyers and advertising men by their interests,

there are about 55 chances in 100 of correct selection. There are about 65 chances in 100 in selecting personnel men from ministers, life insurance salesmen, school teachers, engineers, and certified public accountants.

TABLE XVIII. PER CENT OF INDIVIDUALS IN OTHER OCCUPATIONS HAVING INTERESTS OF PERSONNEL MEN (STRONG)

Occupational Groups	*Per Cent with Interests of All Personnel Men*	*Per Cent with Interests of 75% of Personnel Men Scoring Highest*
All Non-personnel Men	28.3	3.5
Lawyers	47	7
Advertising Men	44	6
Executives	39	7
Ministers	36	2
Life Insurance Salesmen	35	5
School Teachers	35	4
Engineers	34	3
Certified Public Accountants..	34	3
Office Employees	26	2
Department Store Salesmen..	14	0
Bankers	12	0
Artists	0	0

If the score of 125, which is the lowest score of the 75 per cent of the highest scoring personnel men, is chosen as the critical score the chances of correct selection of personnel men from all the twelve other occupations is not improved because there are 25 per cent of the personnel men not selected for personnel interests and thus 25 per cent additional errors that must be added to the errors in selection registered in the column at the right of the table. But for lawyers and advertising men the chances in 100 for correct selection of personnel men have been increased from about 55 to 68. The chances of correct selection can be figured accordingly for all occupations. For department store salesmen, bankers, and artists, this critical score is too high, for the highest individual in any of these groups is far below the score of 125. This critical score works to the disadvantage of these occupations. For bankers only 12 per cent are above the lowest personnel men's score and the

chances of the selection of personnel men from bankers would be 88 chances in 100. But if the lowest score of the 75 per cent of personnel men scoring highest is chosen as a critical score there are 25 per cent of personnel men not selected, and the chances of selecting personnel men from bankers is reduced to 75 in 100. The per cent of overlapping by the non-personnel occupational groups of the 75 per cent of highest scoring personnel men illustrates the fact that a different critical score may work to advantage for different occupations. Different critical scores may be used according to practical purposes. If all of the group or most of the group for which the scoring key is devised must be included in the selection, then about the lowest score of the group must be used as the critical score. But if a part of the group being selected, the lowest scoring part, can be discarded, then an improvement in the basis of selection may sometimes be secured by choosing a higher critical score. It is, of course, probable that many of the non-personnel men have interests common to the personnel men, because of closely allied activities, and this would account for a great many of the selections of non-personnel men by the scoring key for personnel men. In differing degrees these men are personnel men in interests.

CERTIFIED PUBLIC ACCOUNTANTS. The first scoring key for certified public accountants was developed (*20*) upon 99 C.P.A.'s contrasted with 598 non-public accountants of 12 occupations: bankers, office clerks, lawyers, engineers, personnel men, authors, school teachers, life insurance salesmen, advertising men, medical men, ministers, artists. The score range of C.P.A.'s was from +39 to +171, with one man making −11. This score was disregarded, and the critical score of +39 was used. This distinguishes 79.5 per cent of the public accountants from the non-public accountants. Twenty and five-tenths per cent of the non-public accountants overlap the critical score for public accountants. The chances of selecting public accountants from non-public accountants is about 80 in 100.

As in the study of personnel men there is found a difference in the number of men in the different occupational groups with interests similar to certified public accountants, or having scores

above the critical score for the public accountants. In the table (Table XIX) are given the per cent in other occupations scoring above the critical score and above the lowest score made by the 75 per cent of public accountants who scored highest.

TABLE XIX. PER CENT OF INDIVIDUALS IN OTHER OCCUPATIONS HAVING INTERESTS OF CERTIFIED PUBLIC ACCOUNTANTS (STRONG)

Occupational Groups	*Per Cent with Interests of All C.P.A.'s*	*Per Cent with Interests of 75% of C.P.A.'s Scoring Highest*
All Non-C.P.A.'s	20	...
Bankers	59	...
Office Workers	40	9
Lawyers	28	5
Personnel Men	23	6
Engineers	21	2
Authors	18	0
School Teachers and Administrators	29	4
Life Insurance Salesmen	16	4
Advertising Men	10	0
Medical Men	8	...
Farmers	4	0
Ministers	0	0
Artists	0	0

Bankers are very nearly like public accountants in their interests, so near that not quite one in fifty can be distinguished, while office workers come next in sharing interests with the public accountant. All non-C.P.A.'s are distinguished to the extent of 80 per cent from the general group, while they are distinguished from office workers to the extent of 59 per cent, lawyers 72 per cent, personnel men 77 per cent, and so on.

ENGINEERS. Eighty-four engineers were contrasted with 494 non-engineers: medical men, personnel men, school teachers, artists, bankers, office workers, lawyers, certified public accountants, life insurance salesmen, ministers, in developing the first engineers' scoring key. (*22*) Choosing the lowest engineering score of 50 as the critical score, there is an overlapping of the engineers by the non-engineers of 36 per cent

which would give the scoring key a selection value of 64 individuals in 100.

The extent to which the different occupations have the interests of engineers is shown in Table XX.

TABLE XX. PER CENT OF INDIVIDUALS IN OTHER OCCUPATIONS HAVING INTERESTS OF ENGINEERS (STRONG)

Occupational Groups	*Per Cent with Interests of All Engineers*	*Per Cent with Interests of 75% of Engineers Scoring Highest*
All Non-Engineers	36	5
Medical Men	51	9
Personnel Men	39	6
Teachers	37	8
Artists	33	4
Bankers	33	2
Office Workers	32	7
Lawyers	30	5
Life Insurance Salesmen	29	0
Certified Public Accountants	27	2
Authors	22	4
Ministers	10	0

An interesting relationship between medical men and engineers is found. Fifty per cent of the medical men cannot be distinguished from the engineers by their interests. Choosing the lowest score for the upper 75 per cent of engineers as the critical score, the chances of the selection of engineers from medical men has been improved from 49 to 66 in 100. When there is considerable overlapping, as there is here, by the non-engineers of the engineers, a different critical score to that of the lowest scoring engineer gives a better selection basis for some of the occupations. For all occupations making up the general group, there is an improvement from 64 to 70 chances in 100 when the lowest score of the highest 75 per cent of engineers is taken as the critical score.

OTHER OCCUPATIONS. Scoring keys have been developed in a similar manner for the other occupations of Strong's early sample: advertising men, artists, ministers, bankers, lawyers, office workers, life insurance salesmen, school teachers, department store salesmen, and executives, with differentiating inter-

ests for all but executives, who appear to be more heterogeneous in their interests. (*23*) The degree to which these occupational groups have the interests of other groups when scored by their group scoring keys is shown in the table (Table XXI).

TABLE XXI. PER CENT OF INDIVIDUALS IN CERTAIN OCCUPATIONS [AT LEFT] HAVING INTERESTS OF OTHER OCCUPATIONS [AT TOP] (STRONG)

Occupational Groups	*Life Ins. Salesmen*	*Office Workers*	*Lawyers*	*Bankers*	*Ministers*	*Artists*
Certified Pub. Acc'ts..	63	64	26	73	10	4
Engineers	26	45	14	24	7	7
Personnel Men	52	33	50	12	27	2
Lawyers	66	..	100	..	18	5
Ministers	34	..	23	..	100	12
Life Ins. Salesmen...	100	..	28	..	12	0
Artists	21	..	11	..	14	100
Av.: All Non-Groups	44	47	25	36	16	5

Additional figures show personnel managers to be like teachers to the extent of 52 per cent, certified public accountants to be like teachers to the extent of 43 per cent, and certified public accountants to be like advertising men to the extent of 37 per cent, like authors to the extent of 20 per cent, and like doctors to the extent of 10 per cent.

Only 56 per cent of life insurance salesmen are distinguished by their interests from non-life insurance salesmen (the general group), while lawyers, certified public accountants and personnel men have to an extent of more than 50 per cent the interests of life insurance salesmen. A similar situation is true with office workers. Taking the lowest score of the 75 per cent of life insurance salesmen and of office workers who scored highest, instead of the lowest score of all life insurance salesmen and office workers, the discrimination of life insurance salesmen from non-life insurance salesmen is raised from 56 chances to 66 chances in 100 and for office workers from 53 to 64 chances in 100. The critical score chosen decides to some degree the segregation.

Non-lawyers are distinguished from lawyers to the extent of 75 in 100. Personnel managers are the only group with interests so similar to those of lawyers that they cannot be distinguished from lawyers by their interests. From bankers the certified public accountants cannot be distinguished by their interests. Ministers and artists are the two groups with the most distinguishing interests. All other groups can be distinguished from these two in at least 75 per cent of the cases. There are 84 chances in 100 and 95 chances in 100 for these occupations to be distinguished from the other occupations.

Occupational Groups Distinguished by Their Scoring Keys. The extent to which the occupational groups of Strong's preliminary experiment are distinguished from the group of "men in general" is shown in Table XXII. In this case, the critical score is always the lowest, or practically the lowest, for the occupation being distinguished.

Table XXII. Rank Order of Occupational Groups According to Strength of Group Interests

	Extent to which Occupation is Distinguished from General Group
1. Artists	are distinguished to extent of 95 in 100
2. Ministers	" " " " " 84 in 100
3. Certified Pub. Acc'ts	" " " " " 80 in 100
4. Lawyers	" " " " " 75 in 100
5. Personnel Men	" " " " " 72 in 100
6. Engineers	" " " " " 64 in 100
7. Bankers	" " " " " 64 in 100
8. Life Ins. Salesmen	" " " " " 56 in 100
9. Office Workers	" " " " " 53 in 100

These figures are, of course, based upon different sized groups of the "occupation in question" and of the "men in general." They are the assembled results of the studies already referred to as Strong's preliminary experiment and only can be considered suggestive of the trend of group cohesion in interests. The fact that occupational samples were small in this preliminary investigation may have caused a greater differentiation of the occupational group than really exists.

Executives. When the scoring key for executives (*23*) is applied to the general group, executives are found not to be

distinguished to any degree from other occupational groups. The per cents of the non-executives having the interests of executives is shown in the table (Table XXIII).

TABLE XXIII. PER CENT OF INDIVIDUALS IN OTHER OCCUPATIONS HAVING INTERESTS OF EXECUTIVES (STRONG)

Occupational Groups	*Per Cent with Interests of All Executives*	*Per Cent with Interests of 75% of Executives Scoring Highest*
All Non-Executives	70	15
Certified Public Accountants	90	33
Personnel Managers	88	21
Engineers	84	17
Insurance Salesmen	82	18
Lawyers	80	17
Ministers	43	0
Artists	22	2

These occupational groups, except ministers and artists, are not to be distinguished from executives. They have executive interests to more than 50 per cent. The chances of selecting executives from other occupational groups is only 30 in 100, when the lowest scoring executive is used as the critical score. When the score of the lowest executive, of the 75 per cent of executives scoring highest, is used as the critical score the selection is raised from 30 to 60 chances in 100. It is Strong's conclusion that executives do not constitute a homogeneous interest group in the fashion of most of the other groups. (*23*)

SCORING KEYS FOR WOMEN'S OCCUPATIONS. The question has been raised whether there exist occupational group interests among women to the extent that they exist among men. To study this question Hogg (*7*) prepared a sample composed of 355 women, about 60 in each of 7 women's occupations as follows: teachers, authors, business women, department store saleswomen, housewives, retail saleswomen and stenographers. She administered Cowdery's inventory to this group and prepared a scoring key for teachers.[5] The scores of teachers range from 50 to 203 (with two teachers scoring

[5] Hogg's Occupational Scoring Key for Women Teachers, for use with Cowdery's inventory, has never been published.

below 50) and the scores of the non-teachers range from —65 to 115 (see Figure 10).

Other occupational groups were found to have teachers' interests to the degree shown in Table XXIVA (first column).

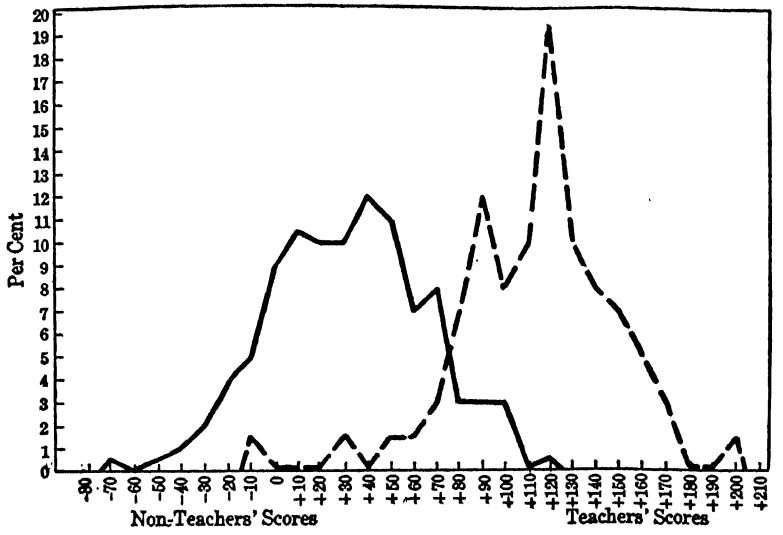

Figure 10. Distribution of scores of women teachers' and "women in general" groups when scored for women teachers' interests (after Hogg).

The per cents of other occupational groups making a score in teachers' interests, equaling or excelling the score made by the upper 75 per cent of the teachers is shown in the last column.

TABLE XXIVA. PER CENT OF WOMEN IN OTHER OCCUPATIONS HAVING INTERESTS OF TEACHERS (HOGG)

Occupational Groups	*Per Cent with Interests of Teachers*	*Per Cent with Interests of 75% of Teachers Scoring Highest*
All Non-Teachers	37	4
Housewives	52	9
Stenographers	49	2
Retail Saleswomen	42	5
Department Store Saleswomen	28	5
Business Women	27	5
Authors	23	0

The critical score for teachers, chosen at 50, offers 63 chances in 100 of segregating teachers from the "women in general" group. If the lowest score of the upper 75 per cent of teachers, which is 90, is chosen as the critical score teachers are segregated to the extent of 71 in 100.

There is suggested here equal group differentiating interests for women teachers to that found in many of the occupational groups of men. Teaching, may, however, be an occupation in which there is greater homogeneity of interests than in other occupational groups of women. Women are thought to be less specialized than men in their occupational interests. It may be that occupational scoring keys will be more difficult to build for women than for men. Manson is working at the University of Minnesota upon the development of scoring keys for occupational groups of women. When this work is finished it should give us an answer to the question of the existence of occupational group interests among women in like degree to among men.*

PRESENT DEVELOPMENT.[6] Strong has discontinued his work upon the occupational scoring keys which he prepared for use with Cowdery's inventory. There was a partial validation for only one of these scoring keys, that of the advertising men. The Cowdery inventory was administered to a control group of 36 advertising men. Thirty-three or 92 per cent of this group made scores above the critical or lowest score of the primary group of advertising men upon whom Strong devised the scoring key. This suggests only a slight reduction in the predictive selection of advertising men (8%).

The preliminary experiment had demonstrated that scoring keys for various occupational groups could be made which would differentiate these groups from "men in general." The experiment also indicated the need for a more extensive inventory and the use of larger primary occupational groups to represent the interests of that occupation.

Strong has revised Cowdery's inventory into "The Vocational Interest Blank," which has been administered to a new sample composed of primary occupational groups, as follows:

* The results of this investigation will be found in Appendix V.

[6] Much of the following information is based upon personal correspondence with E. K. Strong, Jr.

111 Advertisers	143 Ministers
159 C.P.A.'s	121 Personnel Men
325 Medical Men	100 Purchasing Agents
102 Farmers	99 Real Estate Salesmen
119 Vacuum Cleaner Salesmen	193 Teachers
135 Journalists	99 Y.M.C.A. Secretaries
274 Lawyers	124 Chemists
288 Life Insurance Salesmen	552 Engineers

This is a total of 2,944 subjects in these primary groups on which new scoring keys were developed. The interests of each occupational group have been contrasted with the interests of a group of 3,290 "men in general," made up of the primary occupational groups and 849 additional college students. Using the Ream-Cowdery-Strong scoring method, scoring keys have been developed for each of these primary occupational groups, and for other occupational groups added later.

Occupational groups for which differentiating group interests have been established and developed into a scoring key follow:

Advertiser, Architect, Certified Public Accountant, Chemist, City School Superintendent, Engineer, Farmer, Journalist (newspaper editor), Lawyer, Life Insurance Salesman, Mathematician, Minister, Office Clerk, Personnel Manager, Physician and Surgeon, Physicist, Psychologist, Purchasing Agent, Real Estate Salesman, School Teacher and Administrator, Vacuum Cleaner Salesman, Y.M.C.A. Secretary.

These twenty-two occupational groups are regarded by Strong as having differentiating interests to a degree valuable for scoring purposes. Other groups for which scoring keys are available are:

Artist (painter), Author, Civil Engineer, Electrical Engineer, Mechanical Engineer, Mining Engineer, Salesman of low-priced automobiles, District Salesman of vacuum cleaner.[7]

Comparisons have been made by Strong (*25*) of the interests of the various occupational groups when scored with the same scoring key (Table XXIVB). The closeness to zero of these coefficients would indicate the unlikeness of the occupa-

[7] Scoring keys for the twenty-two occupations are on sale by the Stanford University Press, Stanford, California. Scoring Keys for the other nine occupations can be secured on request from the same publisher.

tional groups in their interests and the likelihood that scoring keys will differentiate these groups. When scored for engineering interests, engineers correlate with chemists .88 and with psychologists .44. The table indicates the agreement of interests for the occupations at the left with those at the top of the table, when scored for the interests of the occupations at the top.

TABLE XXIVB. CORRELATION COEFFICIENTS BETWEEN INTEREST SCORES OF VARIOUS OCCUPATIONS (STRONG)

Occupations Scored	*Scored for Interests of*								
	Engineer	*Physician*	*Lawyer*	*Advertiser*	*Life Insurance Salesman*	*C.P.A.*	*Personnel Mgr.*	*School Teacher*	*Purchasing Agent*
Chemist	.88	.68	..	..	..	..	..	..	.36
Farmer	.76	.41	..	..	..	..	..	..	.35
Architect	.57	.71	..	..	..	..	..	..	..
Physician	.53	..	..	..	..	..	..	..	..
Psychologist	.44	.71	..	..	..	..	..	.47	..
Artist	..	.76	.35	..	..	..	..	..	..
Engineer	..	.53	..	..	..	..	..	..	..
Journalist	..	..	.83	.80	..	.33	..	..	..
Advertiser	..	..	.69	..	.43	..	..	..	..
Real Estate Salesman	..	..	.35	.58	.85	..	..	..	.32
Life Insurance Salesman	..	..	.31	.43	..	..	..	..	..
Lawyer	..	..	..	.69	.31	.48	..	..	..
Y.M.C.A. Secretary	..	..	..	..	.38	..	.72	.61	..
School Teacher	..	..	..	..	..	..	.40	..	..
Minister	..	..	..	..	..	..	..	.78	..
Purchasing Agent	..	..	..	..	..	..	.30	..	..
Personnel Manager	..	..	..	..	..	..	..	.40	.30
C.P.A.	..	..	.48	..	..	..	..	..	..

It appears that engineers are most like chemists and farmers in their interests and least like psychologists; that physicians are most like artists and psychologists in their interests and least like farmers; that lawyers are most like journalists and least like artists and salesmen; that advertisers are most like journalists and least like salesmen; that life insurance salesmen

are most like real estate salesmen and least like lawyers; that certified public accountants are little like journalists or lawyers; that personnel managers are most like Y.M.C.A. secretaries and least like purchasing agents; that school teachers are most like ministers and least like personnel managers; that purchasing agents are little like chemists, farmers, real estate salesmen or purchasing agents in their interests. Further comparisons along this line should indicate all the occupational groups with the least and the most differentiating interests.

An extensive analysis of engineering interests has been made (*24*) showing the degree to which 17 other occupational groups, totalling 933 non-engineers, show the interests of engineers and cannot be distinguished from engineers on this basis. (Table XXV.)

TABLE XXV. PER CENT OF INDIVIDUALS IN OTHER OCCUPATIONS HAVING INTERESTS OF ENGINEERS (STRONG)

Occupational Groups	*Per Cent with Interests of All Engineers*	*Per Cent with Interests of 75% of Engineers Scoring Highest*
All Non-Engineers	55	15
Chemists	97	47
Architects	88	34
Farmers	86	37
Medical Men (Surgeons)	75	22
Psychologists	70	24
Purchasing Agents	70	14
Public Accountants	64	13
School Teachers	58	12
Personnel Men	55	19
Artists (Painters)	55	6
Lawyers	47	8
Journalists	38	7
Real Estate Salesmen	32	4
Advertising Men	35	0
Authors	36	3
Ministers	27	2
Life Insurance Salesmen	23	0

This is a more extensive analysis of the interests of engineers than that of the preliminary experiment with Cowdery's inventory in which eleven occupations were scored for the in-

terests of engineers (Table XX). But the discrimination of engineers from the group of "men in general" is not as great. In the preliminary experiment 36 per cent of the non-engineers had engineering interests and 5 per cent scored with the highest 75 per cent of the engineers. Here (Table XXV) 55 per cent of the non-engineers are shown to have the interests of engineers and 15 per cent score with the highest 75 per cent of the engineers. However, chemists were not included in the analysis of the preliminary scoring key and the group of chemists used here included chemical engineers, who would be expected to have engineering interests to a high degree. Also architects, not included in the preliminary experiment, might be expected to share engineering interests. The farmers included in this sample were all graduates of an agricultural college, which possibly accounts for their high scores in engineering interests. But from 16 to 37 per cent more of the medical men, public accountants, school teachers, personnel men, lawyers, artists and ministers also show interests of engineers to a higher degree in this analysis of engineering interests than when the preliminary scoring key was in use. These are seven of the eight common occupations used in the two analyses of engineering interests. Only with Life Insurance Salesmen is there a greater discrimination by the new engineering scoring key.

There is a reason for this lesser discriminating value of the later key. The preliminary engineers' scoring key was based upon a primary group of 84 engineers. The present engineers' scoring key was based upon 552 engineers. Strong says in this connection (*24*) that there is evidence that unless keys are based upon 200 cases the differentiation of this group from other occupations is higher than it normally should be. Strong considers that keys based upon 500 carefully selected members of an occupational group should give a differentiation which is very nearly the true situation for the population at large.

The occupations used in the preliminary experiment were selected to be as different from one another as possible. A certain number of these occupations was used as the "men in general" group in the preparation of the scoring keys. Hence differentiation of the "men of the occupation in question" was

always under the most favorable conditions. Later work by Strong has included a widening of the list of occupations included in the "men in general" group, with the chances of discovering occupations that have common interests and the likelihood of lowering the differentiation of various occupational groups from the "men in general" group.

AN ANALYSIS OF ENGINEERING GROUPS. Separate occupational scoring keys have been made by Strong (*24*) for civil, mechanical, electrical and mining engineers, in addition to the general engineers' scoring key already referred to. These keys are based upon primary groups totaling from 117 to 147 in each specialized profession. The extent to which members of these four groups of engineers score in their own group interests, and in the other specialized group interests of engineers, is shown in the table (Table XXVIA) which is based upon 62 engineers belonging to these four groups.

TABLE XXVIA. EXTENT TO WHICH CIVIL, ELECTRICAL, MECHANICAL AND MINING ENGINEERS HAVE INTERESTS IN THE FOUR SPECIALIZED PROFESSIONS (STRONG)

Specialized Engineering Professions	*Per Cent with Civil Interests*		*Per Cent with Electrical Interests*		*Per Cent with Mechanical Interests*		*Per Cent with Mining Interests*	
	Among All Civil	*Among Highest, 75%*	*Among All Electrical*	*Among Highest, 75%*	*Among All Mechanical*	*Among Highest, 75%*	*Among All Mining*	*Among Highest, 75%*
Civil Engineers	97	84	92	63	97	54	95	44
Electrical Engineers .	86	51	95	71	99	64	88	34
Mechanical Engineers	86	51	94	55	100	79	85	41
Mining Engineers	97	65	95	68	97	70	100	83

Mining engineers show interests slightly different from those of the other specialized engineering professions. Civil engineers come next in difference. But the differences in interests between these four specialized groups are exceedingly small. For this reason Strong does not advocate the use of specialized engineers' scoring keys, but rather the use of the general engi-

neers' scoring key for the measurement of engineers' interests. Correlations between scores in general engineering interests for 63 civil engineers and scores in civil, electrical, mechanical and mining interests are .93, .96, .95, and .93 respectively. These correlations, contrasted with a correlation of .25 for the same group with interest scores in public accounting, indicate the close relationship of the interests of these specialized engineering groups and the absence of differentiating interests among the four professional groups.

Occupational Interest Ratings. Three ratings are used by Strong in the interpretation of the scores when any of the scoring keys are applied to the inventory: Ratings "A," "B," and "C." Interest rating "A" represents a score for occupational interests, which is secured by 75 per cent of successful workers in that occupation. Rating "B" represents a score secured by the 25 per cent of that occupational group scoring least like the group. Rating "C" represents a score not secured by any of the occupational group. It is secured only by other occupational workers, and is interpreted as less like the group than any of the group. The rating of "A" means possession of interests characteristics of a given occupation. A rating of "C" means possession of interests which are not characteristic of the given occupation. A rating of "B" is intermediary ground. Many men rate "B" in other occupations than their own.

The Validation of Strong's Occupational Scoring Keys. The researches of Strong have not as yet progressed to the point of indicating the validity of his occupational scoring keys when applied to control groups. Suggestions of the validity of these scoring keys, however, are found in the relation of the interests of different occupational groups ("the men in general" group) to those of the specific group of the "men of the occupation in question." There is a variation in this relation, indicative of a fundamental different in the interests of occupational groups. Other suggestions of the validity of the scoring keys have been mentioned in connection with the validity of the inventory (pp. 88-90). Of 34 seniors majoring in law at Stanford University, Strong (*25*) reports that 24 per cent rate "A," 62 per cent rate "B" and 14 per cent rate

"C" in lawyers' interests. On the other hand, of 252 seniors not majoring in law, 6 per cent rate "A," 31 per cent rate "B" and 63 per cent "C" in lawyers' interests. Of the law students who rated "A" in interests it was found that all planned to enter the legal profession, of those who rated "B" 69 per cent planned to practice, while of those who rated "C" none planned to continue in the law.

THE RELIABILITY OF STRONG'S SCORING KEYS. The reliability of several of Strong's scoring keys have been calculated by correlating the scores secured from the odd and the even numbered items in the scoring keys. Coefficients are reported by Strong (*25*) in Table XXVIB.

TABLE XXVIB. COEFFICIENTS OF RELIABILITY FOR STRONG'S OCCUPATIONAL SCORING KEYS (STRONG)

		Correlation Coefficients with		
Groups	*No.*	*Lawyers' Key*	*Architects' Key*	*C.P.A.'s Key*
Lawyers	83	.91	.83	.64
Architects	50	.90	.79	.64
C.P.A.'s	45	.89	.80	.81
College Seniors	100	.90	.90	.56
Average	...	.90	.83	.66

The average of these coefficients is .80, which indicates approximately the same reliability for these scoring keys as that reported by Cowdery (Table XV) for his three professional scoring keys.

THE EXISTENCE OF OCCUPATIONAL GROUPS WITH COMMON INTERESTS. Social theorists have maintained the existence of occupational groups distinguished by the similarity of their manners, customs and ways of doing things. It has been left for psychology to test out this theory in the field of interests. The work of Cowdery, Strong and others demonstrates that occupational groups exist which may be distinguished by their interests. These authors contend that "men engaged in a particular profession or occupation have a characteristic set of likes and dislikes that distinguish them from men in other professions." This contention is now experimentally established for many occupational groups.

But can these differences in interests be measured for practical purposes? The interests of the Frenchman are to a degree the interests of the German. They both have the common interests of mankind. It may be that the Frenchmen can be distinguished by their interests from the Germans, but not from all mankind. Studying personnel men, public accountants and engineers, Strong found that other occupations have the interests of these occupational groups to some degree. There seems to be a generality of interests so great as to make the problem of measuring distinguishing interests exceedingly difficult.[8]

There is indication from both Cowdery's and Strong's researches that one occupational group can be distinguished by their interests from one or two, or possibly several, other occupational groups to a degree valuable for personnel selection. But their researches also raise the doubt that one occupational group can be distinguished from all mankind to such a degree. The selection possibilities seem to differ with different occupational groups. Moore's research with design and sales engineers illustrates this, and it may be that scoring keys in the future will be applied to the problem of separating one group only from two or three others. The separation of many occupational groups from all others, by their interests, seems to be possible, but there is still the question whether it can be done to a degree valuable for practical purposes. Judgment must be suspended here awaiting further research, including the validation of Strong's new scoring keys.

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[8] Strong says (*24*) that "it is equally apparent that there are occupations which are quite distinct, and yet nevertheless so related, that men in one of these occupations cannot be differentiated very well from men in another of these related occupations." In this connection Strong refers to the relation between the interests of lawyers and journalists and between chemists and engineers.

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CHAPTER V

THE DEVELOPMENT OF VOCATIONAL INTERESTS IN THE INDIVIDUAL

THE manner in which interests develop, particularly the vocational and educational interests, is puzzling not only to the individual but to everyone who has anything to do with his future, including his parents, his teacher, the vocational counselor and employer. If we could know the things in which a person will be interested throughout life, the educational and vocational problems of youth would lose much of their complexity. An employer upon hiring an apprentice interested in learning a trade would know that this would be a lasting interest. The high school advisor would know that his pupil desiring to follow a major in science would have an enduring interest here. The boy who chose the sea would not wish to change from his sailor's vocation. The girl who chose to be a cook would not desire to be a factory worker or sales girl, and so on.

That this is not the situation is evident. Vocational fads come and go, or sweep over large numbers at certain ages, as, notably, the banking fad among women in the United States during the World War and the engineering fad among young men of all grades of ability. The occupational ideals of the individual are shaped by the social environment. When this changes, vocational ambitions change. New information develops new interests. Mental life is ever unfolding, stimulated by the changing aspects of the environment. What yesterday was the main purpose in life is today of minor importance. As occupations are changed, the individual soon becomes just as interested in his new work. An occupation chosen in early youth is scorned as uninteresting a short time later. Ambitions and interests are left behind in the development of mental activity. To hold that human interests are stable, that interests are permanent, necessarily denies any great amount of variability in the life of the individual.

But, on the other hand, to hold that interests are unstable, absolutely lacking in permanence, denies any possibility of the genetic development of interests, of the formation of habits of being interested. Interests of today are based in part upon past interests, and interests of the future are determined to a measurable degree by interests of the past. That interests have some degree of permanence is unquestionable. Life is a process of unfolding and developing interests.

HISTORICAL PERSPECTIVE. The permanence of subjective interests is a problem which was thought of very great importance, in the early work of vocational guidance, about 1914, of far more importance than it is now regarded. Positions were taken as to permanence and lack of permanence. Evidence was produced in proof of both extreme contentions.

In a series of early articles Kitson, as the spokesman of a conservative policy, endeavored to establish an interest theory for vocational guidance. He said in 1915:

> Vocational guidance holds the fatalistic implication that in the grand cosmic scheme there is but one task that can be accomplished by a single person. It implies that if one finds his niche, success is assured. It further implies that the failures made by "misfits" are due solely to the fact they did not find the right avenue for their talents (*23*, 268). Some vocational guidance proceeds on the assumption that interest should be the guiding factor in determining a career. Such a criterion is unreliable, . . . (*23*, 267) It so happens that some people have no vocational interests. Others, and probably the majority, have several interests that may be turned to vocational account. The situation is further complicated by the fact that interests are often of equal strength. Furthermore, they may be in unrelated fields, antagonistic to each other, or they may be in related fields. . . . Another characteristic of interests is that they vary in permanence. They are not always fixed things, but may be extremely ephemeral. It often happens that a person with well-defined interests acquires new interests of such a nature as to displace old ones or seriously to modify them. So pronounced are the resulting vocational changes that the concept of evolution may well be applied to the vocational choices of many individuals. . . . All evidence shows that the use of interest as a means of directing vocational choice is beset with many difficulties. They have to do with methods of investigation, with the fact of dearth of interests and the multiplicity of interests, with the fact that interests are unstable, evolving things, and finally, with the fact that interest is not always associated with capacity. . . . A theory of vocational guidance that

regards it (interest) as the basic criterion is wrong. It should rightly be regarded as only one criterion and not at all as the sole or invariable decisive factor (*24,* 353-355).

It was in this way that the practical point of view was defined in the work of vocational guidance, a point of view which has determined to a large measure the direction of the research of the following ten years in the permanence of subjective interests and their relation to abilities.

THE DEGREE OF PERMANENCE OF SUBJECTIVE INTERESTS. The problem of permanence has come to be defined in its scientific study as the *degree of permanence,* rather than whether or not there exists a permanence of interests. It is a problem of how much reliance can be placed upon statements and estimates of interests, made by the person himself, or upon the results of inventories and tests of interests, as indications of future interests. An answer to this problem is wanted in personnel selection and vocational guidance. If in general there is a high degree of permanence of interests, then present interests are valuable to predict future interests. If the degree of permanence of interests is low, their predictive value is low.

The permanence of the individual's estimates of what interests him will be treated separately from the permanence of inventoried interests. Parents, teachers, counselors and personnel managers are faced with a decision as to the value of these interest estimates for the prediction of future interests. The degree of permanence determines their value for selection or guidance in education and industry.

It is desirable to know the degree of permanence of the individual's estimates of interests that can be expected in a fairly large or general occupational field, for example, agriculture, the ministry, metal work, medical work, clerical work, and so on. These are called general interest trends. This will be determined first, after which the problem will be narrowed to the degree of permanence for estimated interests in specific occupations, for example, those of lathe operator, motorman, surgeon, English teacher, and so on.

INVESTIGATIONS INTO THE PERMANENCE OF INTEREST TRENDS. Vocational interest trends from early childhood have

been studied in a group of sixty-five young men and women in a western college, a group of sixty-seven students in an eastern college for women, and a special group of fifteen students of advanced vocational education. (*12*) Three educational periods, elementary school, high school, and college or vocational school, were covered by three separate questionnaires. The permanence of vocational interests was measured by determining the degree of general occupational likeness between the different educational periods, and existing throughout the three periods, by the application of a scale classifying the occupations into thirty-two large functional groups.[1] When an individual was found to express for a given period a vocational ambition also expressed for another period within the same one of these functional groups he was rated as having 100 per cent permanence between these two periods. Average permanence in per cents are shown in Table XXVII for the three samples investigated.

TABLE XXVII. PER CENT OF PERMANENCE OF VOCATIONAL INTERESTS MEASURED BY SCALE OF OCCUPATIONAL LIKENESS (FRYER)

Educational Periods	*Western College Group*	*Eastern College Group*	*Vocational Group*
Between Elementary School and High School	90	64	40
Between High School and College	83	63	40
Between Elementary School and College	73	41	73
Throughout Elementary School, High School and College	63	30	33

These figures indicate that the degree of resemblance of vocational interests between the periods studied is significant. Vocational selection and guidance has taken notice of this fact. There is a genetic development of vocational interest trends throughout youth and adolescence in a large proportion of the cases although there are wide individual differences as is indi-

[1] Scale used as published: Pruette, Lorine and Fryer, Douglas: "Group Problems of the Executive, With a Functional Classification of Occupational Groupings," *J. of Pers. Res.*, 1924-25, III, 39-45.

cated by a comparison of the percentages of permanence for the three groups.

This study is in retrospect, based upon remembered interests, for the early periods. Alberty (*1*) studied the interests of the secondary school period in a similar manner, but with the interest choices secured on three occasions separated by a year. He secured three records, in answer to the question: "What do you wish to do to earn your living when you have finished school?" from 209 boys and 278 girls (total 487) and two records from 72 boys and 49 girls (total 121). An occupational classification of fourteen groups was used for the boys and of ten groups for the girls. The per cent of permanence of interests classified into these occupational groups is shown in Table XXVIII.

TABLE XXVIII. PER CENT OF PERMANENCE OF VOCATIONAL INTEREST TRENDS (ALBERTY)

Periods	*Boys*	*Girls*	*Total*
One or two years (Two records)	25	35	28
Two years	33	45	42

This study by Alberty would indicate a lower degree of permanence of interest trends than the first study. While this study uses half as many occupational groups, which would cause a higher degree of permanence, the first study allowed for permanence between any one of several interests for a definite period, which would materially increase the per cent of permanence. One study is of permanence of all possible interest trends and the other is of permanence of the major interest trend.

A similar investigation, covering the junior high school years, was undertaken by Franklin (*9, 10, 11*) in which the vocational preferences of 800 pupils (192 for three-year period) were secured at different times with the following intervals: 5 months, 10 months, 1 year, 3 years. A classification of the occupations into fifteen groups was used. The five and ten months' interval have approximately the same degree of permanence as the year interval (Table XXIX).

TABLE XXIX. PER CENT OF PERMANENCE OF OCCUPATIONAL INTERESTS IN 15 OCCUPATIONAL GROUPS (FRANKLIN)

Over Period of	*Boys*	*Girls*	*Total*
One year	62	71	67
Three years	46	69	61

There is a similar study of college students by McHale (*33*). In this study the occupations were classified into 33 groupings and presented to the students for choices within these groups. In the previous studies the subject was allowed unrestricted freedom of choice and the classification into groups has been made after the choices were secured. McHale secured the vocational preferences of 133 college girls in Goucher College by this method. First and second vocational choices were secured in January 1922 when the girls were juniors and again two years later, in January 1924, six months after graduation. Over the period of two years the first choices were permanent to the extent of 75.2 per cent. The second choices were permanent to the extent of 59.4 per cent. At the time of the second questionnaire 24 per cent of the girls were working in the occupation of their first choice given in 1922 and 22.8 per cent in the occupation of their second choice. This study by McHale suggests that permanence of interests increases with age.

INTEREST PERMANENCE MEASURED BY REQUIREMENTS UPON ABILITIES. The consistency of the requirements upon intelligence of the vocational interests of the different periods is another aspect of the problem of the permanence of interests. The vocational interests expressed by the three college groups (*12*), used in the study given first, were rated according to the average intelligence of workers in these occupations.[2] The ratings of the occupations for each period were then averaged for each individual. The comparison (Table XXX) between periods is a group comparison, and the correlation coefficient is used as the measure of consistency. These comparisons are between requirements upon intelligence of the vocational interests of the various educational periods.

[2] Occupational intelligence norms used, with slight modifications, as published by author: "Occupational-Intelligence Standards," *Sch. and Soc.*, 1922, XVI, 273-277.

TABLE XXX. CONSISTENCY OF REQUIREMENTS OF INTERESTS UPON INTELLIGENCE AS INDICATED BY CORRELATION COEFFICIENT (FRYER)

Educational Periods	*Western Group of 65 Subjects*	*Eastern Group of 67 Subjects*	*Vocational Group of 15 Subjects*
Between elementary and high school	+.24 ± .08	+.52 ± .07	+.46 ± .11
Between high school and college	+.61 ± .06	+.51 ± .07	+.08 ± .15
Between elementary school and college...	+.03 ± .08	+.14 ± .09	+.56 ± .10

This is an indirect measure of permanence, which is of interest to us for its own sake if not for comparison with the measures of permanence based upon occupational likeness. The consistency of the requirements upon intelligence are expressed by the average coefficient (mean) as .41 between elementary school and high school (median, .46), .37 between high school and college (median, .51), and .24 between elementary school and college (median, .14). These values are slightly lower than the values for the same groups when the permanence of interests was measured in occupational likeness.

Proctor (*36*, 79-84; *37*) has also made an indirect study of permanence, based upon the demands of the occupations upon ability. Occupations were ranked in groups according to their requirements upon ability, as follows:

I. Higher professional and executive positions.
II. Semi-professional, managerial, and higher commercial.
III. General clerical and commercial positions.
IV. Semi-skilled labor.
V. Unskilled labor.

In 1917-18 the vocational choices of 771 high school pupils were secured and ranked according to their classification into these occupational groups. Four years later (1921-22) the occupations of 272 of these pupils were secured and ranked again. A comparison of these two rankings is used as an indication of permanence of interests. Fifty-six per cent of the girls and twenty-six per cent of the boys (40 per cent for total) are found to be in the occupations of the same (or higher) rank as their original choice.

THE PERMANENCE OF INTEREST TRENDS (SUMMARY). The various investigations into the development of vocational interests are distinctly valuable in understanding the interests of an individual at a given time. They enable the vocational counselor, clinician, and personnel worker to understand better the psychological nebula out of which come the specific expressions of present interests.

A quantitative summary is given (Table XXXI) of these investigations into the permanence of interest trends. In any use of this summary it must be remembered that the figures included, besides being averages, are results secured by various methods of study.

TABLE XXXI. PER CENT OF PERMANENCE OF INTEREST TRENDS (SUMMARY)

Periods	*Per Cent of Permanence between Periods*	
From Elementary School, throughout High School, to College	42	(Mean from Table XXVII)
From Elementary School to High School	65	(Mean from Table XXVII)
Over Two-Year Period, High School (Boys)	33	(From Table XXVIII)
Over Two-Year Period, High School (Girls)	45	(From Table XXVIII)
Over Three-Year Period, Junior High School (Boys)	46	(From Table XXIX)
Over Three-Year Period, Junior High School (Girls)	69	(From Table XXIX)
From High School to College	62	(Mean from Table XXVII)
Two-Year Period from College to Work	75	(McHale)

The per cents of permanence in Table XXXI may be interpreted as the chances in 100 of there being a certain development of vocational interests from period to period. This gives us a quantitative statement of the genetic development of interests. There is, in general, it would seem, about a 50-50 chance of predicting the development of an interest trend over a considerable period of time—50 for and 50 against. This prediction is, of course, far above a guessing basis when it is recalled that there are as many as 33 possible trends, which

were used in some of the studies. The presence of interest trends is an important factor to consider in mental development, but it is not a factor that can be predicted with any high degree of accuracy.

Those studies making use of all interest trends show a higher per cent of permanence than do those making use of only the first choices in an analysis of their data. It is possible that a truer picture of the development of interest trends is given by investigations considering all interest trends. Such data would indicate that there are 42 chances that an individual will continue a certain interest development, against 58 chances that he will not, throughout the educational periods of elementary school and high school into college.

THE PERMANENCE OF SPECIFIC OCCUPATIONAL INTERESTS. When the permanence of specific occupational interests has been investigated the attempt is usually made to determine criteria from which future interests can be predicted. Such investigations have been confined to short periods of a year or so. The studies that have been made will be discussed under the headings of the various educational periods of development.

PERMANENCE AMONG ELEMENTARY SCHOOL CHILDREN. The changes of vocational interests of 36 sixth-grade pupils have been studied over a six months' period by Poull (*35*). Three choices of vocational interests were secured upon the two questionnaires issued. Forty-four per cent made entirely new choices within the six months' period and twelve per cent more shifted the order of their choices. In forty-four per cent of the cases the first choice remained unchanged after the period of six months had elapsed. McCracken and Lamb (*32*) report 56.6 per cent permanence for seventh-grade boys and 46 per cent permanence for girls over a year period. Barnes (*2*) studied the permanence of the vocational interests of 129 London Board School girls. Sixty-one per cent chose essentially the same occupation on two occasions separated by a year's interval. Gayler (*16*) secured the vocational interests of 159 eighth-grade pupils on two occasions separated by a year. Thirty-three and one-half per cent gave the same choice on both occasions.

An elaborate analysis of the problem among elementary

school pupils was planned by Greany (*17*) to involve the factor of occupational instruction. Pupils in the fifth to eighth grades (76 boys and 102 girls) were divided into two groups, one to be instructed in the occupations over a three months' period. Prior to the period of instruction they were all asked the following question: "How do you intend to earn your living when you are all through going to school?" One year and three months later (including the three months' period of training for the instructed group) this question was repeated. The per cents of permanence for the year and three months' period were as follows:

Instructed Group	24.5 per cent
Non-instructed Group	28.8 per cent

A similar questionnaire was issued immediately following the three months' instruction period to both the instructed and uninstructed groups. A comparison of these results with the results one year later showed the following per cent of permanence:

Instructed Group	75.4 per cent
Non-instructed Group	60.3 per cent

It would seem that the uninstructed group benefited from the instruction of the instructed group, which is very likely, and that this instruction stabilized the vocational interests of both groups.

The permanence of vocational interests of elementary school pupils, of course, varies under different conditions, as shown by Greany's study. A fairly high degree of permanence of the specific vocational interests is shown by some studies and a fairly low degree is shown by others. It is possible that an average of the results for the various investigations, all of which are for about a year period, is an indication of what can be expected under typical conditions (Table XXXII).

The range of these permanence records is from 24 per cent to 75 per cent. The median is 46 and the mean is 47 per cent. Evidently the degree of permanence of the specific vocational interests to be expected under normal conditions in elementary school is about 45 per cent over a year period. This means

that there are 45 chances in 100 of predicting that the vocational interest expressed by an elementary school pupil will be his vocational interest one year hence.

TABLE XXXII. PER CENT OF PERMANENCE OF VOCATIONAL INTERESTS WHILE IN ELEMENTARY SCHOOL (SUMMARY)

Research by	*Per Cent of Permanence*	*Period Recorded*
Greany	23.8 (uninstructed)	1¼ years
Greany	24.5 (instructed)	1¼ years
Gayler	33.5	1 year
Poull	44	6 months
McCracken and Lamb	46 (girls)	1 year
McCracken and Lamb	56.6 (boys)	1 year
Greany	60.3 (uninstructed)	1 year
Barnes	61 (girls)	1 year
Greany	75.4 (instructed)	1 year
AVERAGES { median ..... 46 per cent mean ..... 47 per cent }		6 mo. to 1¼ yrs.

PERMANENCE AMONG SECONDARY SCHOOL CHILDREN. The permanence of the interests of high school pupils has been the subject of a far more extensive study than those of any other developmental period. We should have in these studies a fair answer to the question of what can generally be expected to be the degree of permanence of the specific vocational interests when these interests are estimated by the individual himself.

In March, 1916, Willett (*45*) issued a questionnaire to 136 boys and 167 girls in high school in Hibbing, Minnesota, which asked these pupils the following question: "What do you expect to make your life work?" The question was repeated in March, 1917, one year later. Thirty-six per cent of the records secured were incomplete. When the incomplete records are eliminated from the total, there is forty-two per cent permanence for the boys, sixty per cent permanence for the girls, and fifty-three per cent permanence for all. In a later study (*46, 47*) of another group of 126 boys and 144 girls Willett verified the per cents of permanence almost exactly. Discarding 37 per cent of the total group for whom there were incomplete records there are shown to be 36 per cent permanence

for the boys, 59 per cent permanence for the girls and 49 per cent permanence for the total.

Willett (*46, 47*) followed up his first study securing a third record from these boys and girls in March, 1918, two years after the first record. There were 86 boys and 132 girls included in this final group. Results for the two-year period are shown in Table XXXIII.

TABLE XXXIII. PER CENT OF PERMANENCE OF SPECIFIC OCCUPATIONAL INTERESTS OVER TWO-YEAR PERIOD, AS SHOWN BY THREE RECORDS (WILLETT)

	Same 3 Times	*Same 2 Times*	*Different 3 Times*	*Incomplete Record*
Boys	18.6	9.3	24.4	47.6
Girls	28.8	19.7	21.2	30.2
Total	24.7	15.6	22.5	37.2

These figures give the permanence of the specific occupational choices of high school pupils over a period of two years as 18.6 per cent for boys, 28.8 per cent for girls, and 24.7 per cent for the total group. Discarding the incomplete data from the total there is a permanence record for boys of 35 per cent, for girls of 41 per cent, and for all of 39 per cent over a two-year period with a record taken in the middle.

A vocational questionnaire sent out by Douglass (*8*) to all high school seniors in the State of Washington was returned by about one-half of the pupils, 1,186 boys and 1,658 girls. Douglass asked these students about the permanence of their vocational plan. Eighty-five per cent had made their present choice of a vocation within three years, and fifty per cent within two years. There is suggested here a permanence of fifteen per cent over the three-year period and a permanence of fifty per cent over the two-year period. Beeson (*3*) reports a study of forty-two high school pupils throughout high school, with questionnaires asking for vocational choices issued with intervals of a year. The degree of permanence of the specific vocational interests was as follows:

Throughout four years	10	per cent
" three years	34	per cent
" two years	47	per cent
" one year	66.7	per cent

One third of these pupils gave different choices each year.

The permanence of the specific vocational interests was studied by Alberty (*1*) among the pupils of the fifteen high schools in Cuyahoga County, Ohio. Answers were received in writing from 553 boys and 582 girls (Total 1,135) in grades 9 to 12. Table XXXIV shows the percentage of permanence of choices by sex for the one-year and the two-year periods. The figures for the separate school years 9, 10, 11, and 12, which are not included, differ but slightly from the totals.

TABLE XXXIV. PER CENT OF PERMANENCE OF INTERESTS (ALBERTY)

Groups	*Number*	*Per Cent Undecided*	*Per Cent with Same Choice 1 Year Later*	*Per Cent with Same Choice 2 Years Later*
Boys	553	36	42	24
Girls	582	22	55	36
Total	1135	28	49	30

Eliminating the undecided group from the total and figuring the percentage of permanence for those stating choices, a picture of interest permanence is shown which is possibly nearer the true situation. There is 66 per cent permanence over the one-year period and 38 per cent over the two-year period for the boys; for the girls it is 71 per cent and 46 per cent for these respective periods; for the total group it is 68 per cent over the one-year period and 42 per cent over the two-year period.

As the result of a questionnaire sent by Crathorne (*7*) to 2,083 college freshmen (1,576 women and 507 men) an indication is gained of the changes in vocational interests of these students during high school. The questionnaire was distributed to eleven colleges in eleven different states. The following questions were answered: "If on the day you entered high school you had been asked the question: 'What do you expect to do as your life work?', what would have been your answer? What do you now expect to do as your life work?" The results of Crathorne's investigation are based upon retrospective evidence, as were the results of Douglass' study.

Crathorne shows that

48.8 per cent were undecided upon entering high school, college, or both.
21.6 per cent had same choices on both occasions.
29.7 per cent had different choices on both occasions.

Of those who made a choice on both occasions there is indicated a 42 per cent permanence for the four-year period.

The records of permanence of vocational interests in secondary school vary with the different conditions under which the investigations were made. Willett's record for the two-year period, for instance, is lower than the rest because the permanence over the two-year period is measured as including a record in between the beginning and the concluding records. The investigations for the high school period are summarized in Table XXXV. Averages for the year, two-year, and three-year periods are given in the column at the right. Sex differences are not included in this summary, which aims to offer an answer to the question of what may be expected on the average.

TABLE XXXV. PER CENT OF PERMANENCE OF VOCATIONAL INTERESTS IN HIGH SCHOOL (SUMMARY)

Periods	*Research by*	*Per Cent of Permanence*	*Averages*	
One-Year Period	Willett	49	Median	53
	Willett	53	Mean	57
	Alberty	68		
Two-Year Period	Willett	39		
	Alberty	42	Median	45
	Beeson	47	Mean	45
	Douglass	50		
Three-Year Period	Douglass	15	Median	25
	Beeson	34	Mean	26
Four-Year Period	Beeson	10	Median	26
	Crathorne	42	Mean	26

The permanence of the vocational interests of children at the secondary school level is greater than at the elementary school level, as the records show (Tables XXXII and XXXV).

For the elementary school period there are about 45 chances in 100 that the estimate of vocational interest will be the same one year hence, while for the high school period there are about 55 chances in 100 that the estimate of vocational interest will be the same one year hence. The estimate of a specific vocational interest in neither the elementary nor high school would seem on the average to be very valuable for prediction of future interests one year hence.

PERMANENCE AMONG COLLEGE STUDENTS. The permanence of vocational interests among college students has been studied by two investigators. Kitson (*28, 232*) reports an investigation in which there was 83 per cent of permanence in vocational choice between the freshman and sophomore years in college. Jackson (*22*) has studied the permanence of vocational interests among girls throughout the first three years of college life. The sample was composed of 358 members of the Class of 1929 at Wellesley. One hundred and three, or 29 per cent, recorded the same vocational choice three times; ninety-five, or 27 per cent additional, recorded the same choice twice between either their first and second years or second and third years. Fifty-six per cent, then, recorded the same choice twice. The chance that one of these college girls has of having the same vocational interest over three years is twenty-nine in one hundred and over one year it is fifty-six in one hundred. The records investigating permanence of college interests are too few to make any legitimate comparisons with high school or elementary school.

THE PREDICTIVE VALUE OF SPECIFIC VOCATIONAL INTERESTS. These studies of the vocational interests of the elementary, high school, and college student approach the problem of permanence from the point of view of predicting from the specific interest estimate, made by the subject, what will be the specific vocational interest at some time in the future. None of the studies extend over a period of sufficient time to indicate the degree of permanence of a specific interest throughout the period of education, from childhood to early adulthood. There is shown, however, to be a shifting of interests within a small vocational radius and often duplication of the same occupation. A slight increase in permanence of interests

is found to parallel the increase in age and education. This corroborates a practical observation of counselors and teachers.

In general, it may be said that for a period of one year, whether the subjects are in college, high school, or elementary school, there can be expected, on the average, about a fifty per cent permanence of specific vocational interests. In other words, there is about a 50 in 100 chance of predicting specific vocational interests a year hence from present ones. For longer periods, the permanence of the specific vocational interests is less and the chances of predicting vocational interests two or more years hence is much less than that of fifty in one hundred. The basis of guessing future interests, of course, is far less than 50 chances in 100. It is the fraction of one over the number of occupations with which the subject has informational contact. These results indicate a considerable degree of permanence of specific occupational interests in the mental life of the individual. But from the point of view of vocational guidance and personnel selection the specific occupational interests cannot be used as criteria from which to predict future interests with chances of success that are better than 50 to 50 in the selection of the correct occupation from among one of the hundreds of others which might be selected. These are, of course, the results when the estimate of vocational interest by the subject himself is used.

Some Qualitative Considerations. The statistical study of permanence which has already been presented in this chapter shows only a part of the picture of subjective interests as we would wish to see it. There are various matters to consider in the use of interests for the prediction of future interests, such as the practicality of the interests, the influence of father's occupation in determining the vocational interests, the specificity of these choices, the reasons back of the choices and the relation of vocational interests to vocational opportunity. These qualitative considerations will be reviewed for children in early adolescence and later adolescence as there may be a difference due to age.

The Practicality of Vocational Interests During Early Adolescence. In a study (*12*) of the interest histories of early adolescence, 913 vocational interests were expressed

by 181 subjects. An analysis upon the basis of practicality of these 913 vocational interests of the elementary school period shows that more than 25 per cent are outside the range of expectancy for almost any individual. Thirty-five of these 181 individuals at some time during the elementary school period wished to be actors or actresses. Other vocational ambitions considered improbable were baseball player (1), circus girl (4), concert stage (4), dancer (9), movie star (7), vaudeville star (1), auto racer (1), diver (1), jockey (1). There were 5 individuals who at some time aspired to be President of the United States, 2 wished to be senators, and the following vocations of a similar nature had one or more adherents: diplomat, commander of international Utopia, food administrator, statesman, Secretary of State. There were individuals who aspired to the vocations of Indian fighting (2), hobo (1), prospector (1), air pilot (2), and so forth. The arts engaged the interests at some time of 78 individuals. For most of these a career in the desired field was considered improbable—e.g., writer (25), sculptor (1), composer (1), poet (3), painter (1). One boy thought that he might like to be an inventor and a girl that she might like to scrape new potatoes the rest of her life. The 25 per cent estimate of improbability is based upon the number of vocational interests that are to a high degree impracticable.

The earlier studies of interests, those coming along with the child study movement, in the 'nineties (*2, 34, 43, 48, 50*), were largely concerned with this problem of practicality of vocational and educational interests. Monroe (*34*) studied the interests of 157 children from 7 to 14 years in age. The majority of the fathers were laborers, yet only one wished to follow his father's occupation and over 50 per cent wished to enter the professions. Taylor (*43*), in a study of 2,000 vocational interest compositions written by school children in New York State, remarks that he was surprised at the few extravagant desires among the girls. He found that the interests of the younger children (up to the age of 10) are exceedingly specific, such as, wash clothes, sweep, scrub floor, darn holes, as found among the girls. Eleven per cent of the children at about the age of 10 years seemed to have two or more equally

desired vocational interests at the same time, and they assumed that these could be carried on together.

Taylor (*43*) introduced a method of analyzing the practicality of vocational interests, which has been followed in various studies. He found the percentage of the group wishing to be a worker in a certain occupation and compared it with the occupational opportunities existing. The figures for the 1,000 boys and the 1,000 girls, representing ages 7 to 14, are shown in Table XXXVI.

TABLE XXXVI. PER CENT OF CHILDREN EXPRESSING VOCATIONAL INTERESTS (TAYLOR)

Occupation	*Per Cent of Girls*	*Per Cent of Boys*
Teachers, including Music Teachers	44	3
Dressmakers and Milliners	24	0
Professions: Doctors, Lawyers, etc.	1	14
Trades	1	14
Clerks and Stenographers	11	7
Merchants	2	16
Farmers	0	6
Nurses	2	0
Servants	2	0
Soldiers and Sailors	0	6
Railroad Men	0	3
Miscellaneous	13	31

There was found to be little variation with age for the boys. The trades were most popular in the early years. The numbers interested in the trades decline somewhat in later years. For the girls, storekeeping was a strong early vocational interest, evidently due to a desire to be where candy is sold. This interest declined rapidly to a few choices. Teaching goes through the greatest changes: at 7 there are 41 per cent, at 9 there are 58 per cent, but by eleven there are only 20 per cent.

Barnes (*2*) secured similar records of vocational ambitions from 2,360 London Board School children (boys, 1,000; girls, 1,360), ages 8 to 13 years. The distribution of occupational interests is shown in Table XXXVII.

The children studied by Barnes were from laboring and artisan classes. There would necessarily be, it would seem, some

TABLE XXXVII. PER CENT OF CHILDREN EXPRESSING VOCATIONAL INTERESTS (BARNES)

Occupation	*Per Cent of Girls*	*Per Cent of Boys*
Laborer	0	14
Artisan	0	41
Domestic Work	37	0
Dressmaking	26	0
Teaching	24	0
Transportation	0	22
Protection	0	14
Business	10	13
Professions	0	3
Miscellaneous	6	0

adjustment of the interests in this list to the practical opportunities. Thus, there are 55 per cent of the boys expressing their vocational interests in the occupations of artisan or laborer. Barnes has "followed up" the girls as they have gone to work. The record for the girls' interests and their choice of a vocation are compared in Table XXXVIII.

TABLE XXXVIII. PER CENT OF GIRLS EXPRESSING VOCATIONAL INTEREST AND PER CENT TAKING JOB (BARNES)

Occupations		*Per Cent with Interest*	*Per Cent Taking Job*
Domestic Service		37	27
Dressmaking		26	15
Business		10	4
Teaching		24	3
Averages	Median	25	10
	Mean	24	12

The averages show that there is about a 50 per cent realization of the children's vocational interests. The greatest change is in teaching where the reduction is from 24 to 3 per cent.

In the study of the 181 vocational histories (*12*) all (100 per cent) wished to be teachers at some time during their elementary school days. Eighty of these children, or 44 per cent, wished to be workers in medical science. Forty-four, or 24 per cent, desired to enter social service. Forty-one, or 23 per

cent, wished to be engineers. The probability that these individuals will attain any one of their vocational ambitions of elementary school is undoubtedly low, as the figures of permanence have shown. Yet, any one of these individuals may become one of the specialists he desired to become early in life, and a prediction from the vocational interest at that time would come true. Furthermore, a thread of occupational likeness may often be traced from one of these early ambitions throughout the training period. But to find out and predict beforehand such a development would appear to be almost impossible.

Mackaye (*31*) has studied the fixation of vocational interests by a genetic case method among several hundred children in California. Mackaye thinks that fixations of vocational interests occur at definite periods under the pressure of environmental stimulation, such as the graduation from elementary school. The fixation or choice of a career was motivated by the desire to escape unpleasant tasks or to be somebody in the group. It is a definite part of the personality make-up. Mackaye points out the impracticability of these early interests and concludes that the "interests of a child do not constitute a proper basis for educational and vocational guidance."

Lehman and Witty (*30*) have studied the genetic development of various vocational interests throughout the total period of adolescence. They secured a sample of children, ranging in ages from eight to eighteen, which was large enough so that the interests of each age might be representative of that age. The sample was composed of 3,254 boys and 3,286 girls, a total of 6,540 children, living in Topeka, Kansas. To these children was administered Lehman's Vocational Attitude Quiz, composed of 200 representative occupations. In answering this quiz the subject is asked to indicate the three occupations that he likes best. Results are given by sex for the following occupations: cowboys, aviators, stenographers or typists, movie actresses (Table XXXIX). While these figures are not for the same children for each age, they do suggest the genetic changes that can be expected throughout the developmental periods. It would be interesting to see similar results for other occupations.

TABLE XXXIX. PERCENTAGE OF CHILDREN OF VARIOUS AGES WHO REPORTED THEY LIKED CERTAIN OCCUPATIONS BEST (LEHMAN AND WITTY)

Ages	*Girls*		*Boys*	
	Stenographer or Typist	*Movie Actress*	*Aviator*	*Cowboy*
8.5	5	20	6	38
9.5	11	20	13	26
10.5	14	29	18	34
11.5	22	22	21	27
12.5	26	17	24	16
13.5	27	19	19	11
14.5	31	10	24	1
15.5	24	6	18	1
16.5	32	5	14	0
17.5	25	3	18	0

THE PRACTICALITY OF VOCATIONAL INTERESTS DURING LATER ADOLESCENCE. Turning now from the period of early adolescence, let us see if the vocational interests of later adolescence offer any more practical assistance in the prediction of future interests. Proctor (*36*, 66-74) has shown that there is quite a difference between the vocational interests of high school pupils and the occupational opportunities as indicated by the census. While ninety-one per cent of the choices of 930 pupils, selected from eight high schools in California, are "white collar jobs," only sixteen per cent of the occupational opportunities shown by the census are "white collar jobs." Of course, high school pupils represent a selected group of individuals, all probably above the average in intelligence. But it is improbable that ninety-one per cent will realize their ambition of a clerical, business, or professional occupation. Proctor has arranged these pupils into occupational groups according to their interests, which shows the discrepancy between these interests and the occupational opportunities (Table XL).

This is a comparison of interests and opportunity. It is a comparison of ambition and reality. Many people may never be interested in occupational reality, they may never be interested in the occupations they are forced into. Fifty per cent of a group of workers, largely in "white collar jobs," were frank to say they were not interested in their jobs. Woodruff

(*49*) shows that the interests of 1,590 high school girls, when they check things they prefer to do best on a list, are somewhat different from what these same girls expect to have as their occupations. Music, dancing, typewriting, stenography, acting, art drawing, teaching, dressmaking were the leading vocational interests. But when these girls indicated the occupation they expected to follow, stenography, bookkeeping, stenography and bookkeeping in combination, and office work, were the order

TABLE XL. COMPARISON OF INTERESTS AND OPPORTUNITIES (PROCTOR)

	Per Cent of Pupils' Interests	*Per Cent of Opportunities*
Professions	61.7	4.4
Business and Clerical	29.7	14.1
Mechanics and Industry	3.6	28.0
Agriculture	5.0	33.1

of interests. There is evidently some realization during early adolescence that what one really wants to do in life cannot be attained. This realization possibly comes to the girl earlier than the boy. The girl is more practical in her vocational interests. But when given free rein to express her desires through daydreams she shows a high degree of impracticality, as shown by Pruette's study (*38*, 125) of the interests of 347 high school girls, 46 per cent of whom desired to enter the arts.

Douglass' (*8*) study of the vocational interests of 2,844 high school seniors reveals the situation for the State of Washington. The distribution of pupils according to their interests is given in Table XLI.

TABLE XLI. VOCATIONAL INTERESTS OF HIGH SCHOOL SENIORS (DOUGLASS)

	Per Cent of Girls		*Per Cent of Boys*
Nursing	4.8		...
Stenography	16.6		9.3
Music	4.8		
Journalism	3.1		2.8
Business	10.0		19.6

	Per Cent of Girls		Per Cent of Boys
Teaching	36.7		1.5
Engineering	...		30.2
Agriculture	9.4		13.3
Pharmacy			1.7
Professions			10.8
Mechanics	...		3.0
Miscellaneous	11.7		6.6

Douglass discusses the relation of these interests to the opportunities in the State of Washington. For the girls there does not appear to be very great overcrowding, excepting possibly in the case of stenography and business. The teaching profession seems not overcrowded. One-fourth of the teachers in the schools are new each year, and they must be high school graduates. But with the boys, as shown in Proctor's study, there are entirely too many expecting to take up the profession of engineering and too few agriculture. Also, Douglass thinks there are probably not business opportunities enough of the types desired for the 19.6 per cent interested in those occupations. The interests of these high school girls are far more practical than those of the boys, as is shown by numerous studies.

Alberty's study of 1,468 boys and 1,507 girls in the seventh to twelfth grades of fifteen high schools in Ohio (*1*) shows that of the boys 18 per cent wished to be engineers and 43 per cent wished to enter the professions. This is out of all proportion to the scale of opportunity. Fifty-three per cent of the girls in this study wished to enter the professions and 30 per cent wished to be teachers. Beeson found in a study of 619 high school boys and girls in Colorado (*3*) a distribution of vocational interests clearly out of practical relation to the opportunities of that State. Grouping engineering and teaching with the professions, there are 45 per cent of the boys and 42 per cent of the girls who wish to enter professional occupations. In addition, there are 12.8 per cent of the girls who wish to be nurses, 21.7 who wish to be stenographers, and practically none who wish to be housewives. Only ten per cent of the boys wish to be business men, although thirty per cent

of the opportunities in the locality are in this field. Twenty-three per cent of the workers in Colorado are in agricultural occupations. Sixteen per cent of the boys and 0 per cent of the girls wished to enter these occupations.

Similar surveys of the vocational interests of high school pupils in relation to opportunities have been made in various cities and states. The figures given above will serve to illustrate the general situation of disproportionate interest in the professions. Surveys in Illinois, Indiana, Massachusetts, Wisconsin, Ohio, Colorado, California, Washington and other states indicate that about 50 per cent of high school senior boys wish and plan to enter the professions. The situation is similar but not so extreme for the girls. Evidently one can expect the vocational interests of later adolescence to be much more practical than during early adolescence, as these studies show, in spite of which they will be to a high degree contrary to vocational possibilities.

Of course, when it is said that there is a 5 per cent opportunity and a 50 per cent choice of the professions among high school pupils, this is an exaggeration of the difference between interests and opportunities. The opportunity for a high school graduate to enter the professions is much greater than one in twenty. More than 50 per cent of the pupils who enter the elementary school drop out before the freshman year in high school and a goodly number of the remainder never graduate. This leaves to those who do graduate all of the professional opportunities. Thus the disproportion of interests and professional opportunity is by no means so great as it appears on the surface, but it is great enough to require consideration on the part of all engaged in vocational counselling. If vocational counselors took expressed interests of adolescents as seriously as they are sometimes urged to do, they would be compelled to give very impractical and harmful advice or they would be obligated to turn social reformers in an attempt to remodel the occupational world nearer to the adolescent's heart's desire. The fact that the number of superior jobs may easily be less than the number of superior persons deserving them has already been brought out; it is even more obvious that they

must be less than the number of persons of inferior ability who nevertheless desire the superior job.

REASONS FOR VOCATIONAL INTERESTS. The practicality of the vocational interests during the period of adolescence is further studied in the reasons given for the vocational choices made. Taylor (*43*) found that before the age of seven the reason for choice given was often "because I like it." Forty per cent of seven- and eight-year-old children could give no reason for their choice. This is reduced to 32 per cent at the age of nine and later to 16 per cent. Beginning at seven years of age, and prominent in the vocational interest compositions to the extent of 25 per cent at the age of twelve years, Taylor found the economic reason to earn a living. Barnes (*2*) characterizes the reasons for choice given by both boys and girls as "vague and indeterminate" and having little basis in fitness or experience for the occupation. Young (*50*) studied the reasons given for the vocational choices of London Board School girls between the ages of 7 and 14 years. She concludes that while the girls on leaving school have some knowledge of the industrial possibilities for them, in general, caste, tradition, imitation, and so on are far more influential than their interest or fitness in determining vocational choice. Valentine and Ritchie (*44*) have investigated the spontaneous reasons given for their choice of an occupation by boys in secondary schools in England. It was found that more than half of the senior boys made their choice of an occupation on a wrong or inadequate reason. The vocational interests of adolescence would not appear to be based upon a very practical foundation. Douglass (*8*) found a similar situation when the reasons for vocational interests given by high school seniors in the State of Washington were analyzed. Both boys and girls were interested because of a general impression that the occupation offered advantages and was attractive. There is little evidence to show that they considered their fitness for the occupation. Among the reasons given, school work and first-hand vocational experience were in general unimportant. School work was found to be important with the students of stenography and clerical work, and vocational experience was found important among boys engaged in agriculture and music, which leads to

the conclusion that a fair amount of experience should offer a more practical basis for interest.

THE OCCUPATION OF THE FATHER AS AN INFLUENCE. The occupation of the father has been considered as a possible determiner of vocational interests. It is recognized that the weight of this influence might be greater or less according to the occupational conditions of choice in various countries. Taylor (*43*) found among New York State school children that 16 per cent of 1,000 boys chose the occupation of the father or of a relative. This choice was highest among the earlier ages and decreased by ages nine or ten. In his study of high school pupils Beeson (*3*) found that eleven per cent desired to follow their fathers' occupation. In the ninth grade the largest percentage appeared of boys who wished to follow the fathers' occupation. By the eleventh and twelfth grades this percentage had markedly declined, so that here were the smallest number of boys wishing to follow in their fathers' steps. This seems to be the general situation, that the older the boy grows the less likely he is to wish to follow his father's occupation.

It may be that an influence of the fathers' occupations is present in the mental requirements of the children's occupational choices. Pruette has compared the mental levels of the fathers' occupations with the mental requirements of their daughters' choices. In her study of high school girls (*38*, 127 ff.) she found that 66 per cent of the daughters desired an occupation on a higher level of intelligence than the occupations of the fathers, while 23 per cent wished to remain on the same level and 11 per cent selected occupations that were lower. In her group there was little indication of any positive effect of the fathers' occupations upon the choices of the daughters. Bowley (*4*, 89) has made a similar study among 665 working class households in England, in the endeavor to decide whether the children have risen above the fathers' occupations. On the basis of his own judgment he found that 19 per cent were in a higher position than that of the fathers, 71 per cent on the same plane and 10 per cent on a lower level. This study shows the influence of the total environment upon vocational development, with particular reference to England.

In Sears's study (*39*) we have, perhaps, the influence of the fathers' occupations shown most clearly for the American population. Sears secured vocational choices of 1,039 school boys in Oakland, California, and in addition the occupations of their fathers. He found that for forty of the sixty occupations of the fathers not one son chose his father's calling. In the other twenty there were only a few such choices. Out of the total, 76 boys, or 7.3 per cent, wished to follow their fathers' occupations. These boys were in the seventh and eighth grades, with ages from ten and a half to nineteen. Judging from other studies it seems probable that the percentage choosing the fathers' occupation would decline still more as they continue their education. In Table XLII is shown a comparison of the choices of sons and the fathers' occupations.

TABLE XLII. COMPARISON OF OCCUPATIONAL CHOICES OF SONS WITH OCCUPATIONS OF FATHERS (SEARS)

	Sons' Choices		*Fathers' Occupations*	
	No.	*Per Cent*	*No.*	*Per Cent*
Professions	536	51.0	153	14.5
Trades	77	7.3	313	30.0
Business	148	14.1	346	32.1
Agriculture	72	6.9	28	2.6
General	95	8.3	177	15.7

Here we have the 50 per cent choosing the professions, as is found in so many studies. Based upon the distribution of the occupations of the fathers there are 19 occupations which are important in Oakland which have no special attraction for the boys. About 66 per cent of the boys chose 11 occupations. Impracticality of choice is illustrated again by this study, as well as by those mentioned before.

In this country the father's occupation seems to have little positive influence upon his son's or daughter's choice of a vocation. Perhaps 10 per cent of the sons will be interested in their fathers' occupation. The occupation known best by the son seems to be but a slight determiner of vocational interests, unless it actually has a negative value.

THE FLUCTUATION OF VOCATIONAL INTERESTS. It is possibly more useful to regard the varied assortment of vocational interests as a problem in fluctuation rather than a problem in permanence. For the purpose of obtaining an index of the fluctuation of vocational interests, 145 interest histories were summarized and assembled for study (*14*). The number of different vocational interests or ambitions expressed by the individual throughout the period of the case history, which usually included recollections reaching back as far as dawning adolescence and continuing to adulthood, was used as the measure. The following summaries, selected at random among the group that had the average number of vocational ambitions, are typical:

Subject 3. M. R., age 18; Alpha score, 155. Different vocational interests: policeman, business man, lawyer, doctor, engineer, chemist. This subject plans now to follow a medical career.

Subject 4. M. H., age 20; Alpha score, 150. Different vocational interests: school teacher, store clerk, actress, concert pianist, domestic science supervisor, senator. Regarding vocational plans, this subject states: "I wish to become a teacher after my work at the university, although I have no great desire for that particular work."

The numerical results of this investigation show an average (median) of six vocational interests, the smallest number being one and the largest thirteen. The range of the middle 50 per cent is four to seven interests, inclusive. A distribution of the number of interests follows:

Number of Different Interests	*Number of Subjects*
1-4	52
5-8	75
9-13	18
1-13	145

It is much more difficult to use the vocational interest as predictive of a future interest than to follow a common interest trend throughout an interest history. The following history summary well illustrates the difficulty of estimating the significance of a vocational interest at any time, even though a com-

mon element may be found to exist through most of the different vocational interests when the history is viewed as a whole:

Subject 5. F. D., age 21; Alpha score, 130. Different vocational interests: Indian fighter, fireman, cowboy, policeman, salesman, auto racer, air pilot, mechanic, business man. This subject plans to become a salesman of wholesale dry goods.

A wise counselor might have "steered" this individual into the vocation of a salesman, but he would have placed little value upon any one of these vocational ambitions as indicative of future interests.

This investigation, with its demonstration of the fluctuation of vocational interests throughout adolescence and of the impossibility of estimating at any time the interest expressions of other periods, places the situation before us in a practical way. It shows the "will-o'-the-wisp" nature of expressed vocational interests and the impracticability of predicting future interests. The following interest-history summaries illustrate the fluctuation of vocational interests during adolescence and the difficulty of using such interests for vocational selection and guidance:

Subject 6. H. F., age 20; Alpha score, 131. Different vocational interests: home-maker, store clerk, tutor, high school teacher, dressmaker, stenographer. This subject has two vocational plans for the future: teacher in high school, tutor of public speaking.

Subject 7. B. R., age 21; Alpha score, 142. Different vocational interests: store clerk, housekeeper, dressmaker, nurse, actress, concert singer, concert pianist, artist, writer, teacher, social worker, wealthy idler. This subject plans now to be either a musician, a teacher, or a social worker.

Subject 8. D. R., age 19; Alpha score, 181. Different vocational interests: nurse, writer, cow-girl, dancer, actress, agent, interior decorator, social worker, teacher. This subject now plans to follow the teaching profession.

Subject 9. F. M., age 29; Alpha score, 144. Different vocational interests: machinist, salesman, banker, language teacher. This subject now plans to follow language teaching.

Subject 10. L. S., age 20; Alpha score, 134. Different vocational interests: locomotive engineman, farmer, teacher, dentist, electrical engineer, auto mechanic, mechanical engineer, structural engineer, public accountant, chemist, salesman. This subject is considering as his future vocation public accountancy, electrical engineering, and salesman-

ship, although he is majoring in the school of commerce and finance, which would eliminate the possibility of entering engineering immediately after graduation.

Subject 11. G. S., age 19; Alpha score, 176. Different vocational interests: cowboy, policeman, storekeeper, soldier, locomotive engineman, car conductor, teacher, doctor, minister, sailor, musician, business man, lawyer. This subject plans now to be a lawyer.

Subject 12. V. J., age 20; Alpha score, 160. Different vocational interests: music teacher, actress, school teacher, circus girl, interior decorator, stenographer, auto saleswoman. This subject is now considering the last three vocations listed.

Subject 13. M. F., age 24; Alpha score, 155. Different vocational interests: doctor, marine engineer, lawyer, musician, journalist. This subject now plans to follow the last vocation listed.

Subject 14. F. F., age 25; Alpha score, 161. Different vocational interests: teacher, cowboy, prospector, sailor, soldier, railroad engineman, business man, civil engineer, electrical engineer. This subject has a family and is working hard toward the vocational objective of electrical engineering.

Subject 15. J. H., age 21; Alpha score, 154. Different vocational interests: stockman, artist, business man, architect, engineer, writer, teacher. This subject plans either to teach or to enter business.

THE PERMANENCE OF VOCATIONAL POSITIONS. Another type of study of vocational interests has been initiated by Kitson. (*26, 27*) He advanced the theory that it may be desirable from the point of view of successful adjustment to shift about in vocational interests. This theory implies that fluctuation in vocational interests has practical value for guidance. To test this theory the biographies of 1,000 eminent Americans, sampled from 25,000 in *Who's Who in America* (1919-20), were studied to secure an index of what would seem to be legitimate changes in interests to achieve successful adjustment. (*26*) The 1,000 eminent individuals, most of whom were in the professional groups, were classified into eleven occupational groups and the changes tabulated between these groups. Sixteen per cent of these 1,000 individuals reported vocational changes of a drastic nature in their biographies. The vocational changes of 1,000 eminent American women in *Who's Who* (1922-23) were studied in a similar manner. (*27*) Eleven per cent of these women made a drastic change of vocation at least once.

Hartson (*18*) has followed the same line of attack with college students at Oberlin College. He secured a vocational history from each of 618 men and 982 women graduates between 1914 and 1922. This history gave first choice of an occupation, final choice, and changes made.[3] The occupations of these graduates were classified into fifteen occupational groups (10 for women), such as banking, college teaching, industrial chemistry, secretarial work, medicine, and so on. Fifty per cent of the men and sixty-five per cent of the women (eliminating from consideration about half of the group of women who started in the occupations but dropped out through marriage) remained in the occupational group of their first choice. The shifting about from group to group was similar for the women and for the men. Among the 50 per cent of the men who made a change from one occupational group to another, some returned to their first occupational choice, making the total permanence between first and final choice 64 per cent for men. Permanence of choice is found to be different for different occupational groups. The choices of specific occupations in business involved a larger amount of experimentation for both men and women than did the choices in the professions. The occupations having 75 per cent permanence for the men are law, medicine, physical education, and banking; for women, physical education, library work, and high school teaching.

Other studies have compared the choice of a position and the expression of vocational interest prior to the time of seeking a job. Proctor (*36*) made a check-up on 272 individuals at work, who four years previously, in high school, had stated their vocational interest. Thirty-two per cent were found to be working in their vocational interest four years after stating it, which is indicative of a somewhat higher degree of permanence of vocational interest than the figure suggests when the difficulty of obtaining a position of the nature of one's ambition is considered. Some of these subjects had been out of high

[3] It is thought by Hartson that a final occupational choice was secured from most of these cases, as the average final choice recorded was made 1.77 years after graduation, and 68% had made this final choice by 4.19 years after graduation. The most recent class studied, the Class of 1922, had been out of college 4 years when the study was made.

school only about a year. Alberty (*1*) also followed forty pupils, who had given their vocational interests, from high school into work. Two years after stating their vocational choice, 35 per cent were found to be engaged in their vocational interest. Fifty per cent had made major changes.

AGE, EXPERIENCE, PROFESSIONAL LEVEL, AND THE PERMANENCE OF INTERESTS. There is a commonly accepted theory that the permanence of interests increases with age. This has already been suggested. But there are two aspects to this problem. There is age as a time factor and age as a habit-formation and experience factor. That permanence of interests increases with information and habit formation and that these factors usually increase with age, is probably a more correct statement of the situation.

Kitson[4] advances the theory that professional level is a factor in permanence and is collecting data upon this problem. He thinks that the higher a worker is professionally, and the more he has invested in his training, the more interested he is likely to be in his work and the less likelihood there is of a change of vocation. Kitson (*29*) measured the degree of interest of teachers in their profession by means of his interest rating scale. He asked 409 teachers to consider as the 100 degree point that activity in which he would wish to spend his major time if he could work at what he wished, and to estimate the distance down the scale which represented his interest in his present occupation. Elementary female teachers, secondary female and secondary male teachers were included in the sample. In general, it was found that teachers with the highest degree of interest had been teaching the longest. The results are shown in Table XLIII for degrees of interests.

TABLE XLIII. DEGREES OF INTEREST AND YEARS IN OCCUPATION (KITSON)

Group	*Number*	*Degree of Interest*	*Median Number of Years*
Elementary School Teachers (Women)	33	100	15
	13	90	10
	13	80	10
	3	70	30

[4] Correspondence under date of April 8th, 1929.

Group	*Number*	*Degree of Interest*	*Median Number of Years*
High School Teachers (Women)	43	100	11
	94	90	8
	62	80	10
	17	70	8
High School Teachers (Men)	28	100	7
	19	90	3
	23	80	3
	9	70	3

With the elementary school teachers, those who had taught sixteen years or more, there was an average degree of interest of ninety-two on the rating scale; for those who had taught ten years or less there was an average degree of interest of seventy-five.

ESTIMATED INTERESTS (SUMMARY). This review of the research upon the development of vocational interests leads to certain conclusions.

1. There is frequently found a general trend of vocational interest developing throughout the training period of life. This general trend can be measured in occupational likeness and in its demands upon intelligence. The evidence indicates that in forty to fifty per cent of the cases there is a genetic development of vocational interests throughout elementary school, high school, and college. But a prediction for the individual that there will be a certain development or genetic trend of vocational interests can be made with few chances of success. A case history may show a trend of vocational interest development, as is found in almost fifty per cent of the cases, but this trend can only be observed after the vocational development has taken place and cannot be prophesied during early adolescence as there are found then, on the average, about five different specific vocational interests.

2. There is a relationship between the specific vocational interests over a short period of life, which is borne out by numerous investigations. For longer than a year during early and later adolescence, however, this relationship is not sufficiently high for prediction. That is to say, prediction that the specific vocational interest of a youth one year from now will

be the same as his present vocational interest has no better than fifty chances in one hundred of being correct. For periods longer than one year the chances that this vocational interest will not be the same are greater than the chances that it will be the same.

3. The vocational interests of early adolescence during elementary school, are exceedingly impractical, far removed from reality and subject to enormous fluctuation. A rough measure of 913 vocational ambitions during this period shows that more than twenty-five per cent are impractical, while a much larger per cent of the others are improbable.

4. The vocational interests of early and of later adolescence are both impractical when interests and opportunities are compared. There would appear to be less than fifty per cent who do achieve their vocational interest when the time comes to take a position and to adjust to the occupational world.

5. The qualitative study of vocational interests reveals these subjective factors in mental life as influenced by social status, age, experience, father's occupation, and professional achievement, among other things, in various degrees. The reasons given for these vocational interests do not lead to the conclusion that there is a very close correlation in the mind of the individual between interest and fitness or opportunity.

6. A measure of fluctuation of vocational interest from early adolescence to adulthood shows a median of six different major interests for one hundred and forty-five subjects. The largest number was thirteen. Summaries of interest histories have been given, showing the fluctuation of vocational interests.

7. There seems to be practical value in these fluctuations of interests in a try-out of opportunities. Investigations indicate that eminent people and college graduates in general have shifted about from occupational group to occupational group in making a satisfactory vocational adjustment.

8. These facts have a profound significance for the work of selection and guidance. Specific interests, estimated by the subject, are not permanent more than fifty per cent of the time over a period longer than a year. These specific interests cannot be used as exact guides nor as guides of any kind except in a suggestive capacity. For the boy or girl interested in a

particular occupation, there is usually a trend of occupational development over a fairly long period. Some suggestion of this can be obtained from the study of the interest history. But for the teacher offering educational guidance, the counselor offering vocational guidance, or the employer selecting an apprentice, to use an expression of interest as a guide to future plans is a very unscientific and impractical way of achieving an adjustment. The vocational interest estimate is of little significance for prediction. It is only important when linked with other significant criteria of selection and guidance.

9. When all this has been said, however, there are some very useful indications from the facts upon permanence or fluctuation as the problem may be called. There is a genetic development of vocational interests. A complete study of the interest aspect of personality reveals this over a long period of time. The investigations of permanence of specific interests indicates this development. On a guessing basis, a future specific interest would have one over the number of occupations known by the estimator of being the same as a past interest. The investigations into the permanence of specific interests show that this relation is raised to 1 in 2 for a year period. There is, then, considerable stability in the interest life of the individual even though the degree of permanence is insufficient for the prediction of future interests.

10. It is the total picture of interests that is valuable in the adjustment of the individual—their practicality, the presence of various interest trends, their synthetic relationship as indicating development, their relation to fitness, abilities, and achievement, their fluctuations in a functional field of the occupations, and so on, that constitutes the clinical evidence useful in furthering a vocational adjustment.

THE PERMANENCE OF THE INTERESTS AS MEASURED IN THE INTEREST INVENTORY. The problem is changed at this point from that of permanence of the interests which are estimated by the individual to the permanence of the interests, or likes and dislikes, which are expressed in answering the items of an interest inventory.

In the use of interest inventories the problem of permanence of interests is often confused with that of the reliability of the

inventory. The question of reliability is a question of duplication of the measure. Does the test measure the same thing? Or is there something inexact in the test that causes it to measure differently upon different occasions? This is the problem of reliability. The reliability of an interest inventory could be tested out best by the immediate repetition of the inventory, with the memory influence of what was estimated on the first occasion controlled on the second occasion. The permanence of interests is established by a comparison of interests as inventoried upon one occasion with interests as inventoried upon another occasion. If the reliability of an inventory were determined by administering the inventory upon two occasions widely separated the reliability measure would be influenced by the lack of permanence of the interests themselves.

INVESTIGATIONS INTO THE PERMANENCE OF INVENTORIED INTERESTS. Gaw (*15*) has tested the permanence of interests as measured by Freyd's inventory of "Occupational Interest" for Women (1923 edition). She administered the inventory to 191 freshman women and again to 105 of the same students in the sophomore year at Mills College. Correlations were made for all freshman papers against all sophomore papers for each of the 67 items. This does not show how each individual varies with himself at a later date. But it shows how all individuals vary between two dates in one item of the inventory, and an average correlation indicates how all individuals vary for all items. The range of correlations, showing a range of permanence for the separate items, is from —.11 for the item, *nurse,* to .86 for the item, *physician.* The middle fifty per cent of correlations is from .40 to .61, with a median of about .50. This average correlation expresses the tendency.

The Cowdery interest inventory was administered with intervals of one and three weeks to a group of six graduate students in psychology. An average of seventeen per cent of the items were changed over the one-week period and twenty-five per cent over the three-week period. This is a small group, but it is suggestive of the fluctuation of these interest expressions which may be expected even in a short period.

Brainard (*5*) administered his interest inventory of engi-

neering activities on two occasions, separated by a period of four college years, to 25 engineering students. With a total score range of 50 points, there was a shift of 6 to 33 points for the twenty-five cases, with a median shift of 16 points. If this median shifting were 25 points, there would be an equal chance of the individual appearing within either half of the group. As the median shift is 16 points there is an improvement of 36 per cent over this prediction. By the same reasoning there is an even chance that an individual will be in the same third of the group (32 per cent to be exact).

Shuttleworth (*41*) administered his "University of Iowa Assayer" on two occasions separated by five weeks to a group of 38 college students. The estimation of the interests for the two periods was from 44 per cent to 79 per cent the same. The average permanence for the group was 62.4 per cent. There are found to be 62 chances in 100 of these interests being the same over a period of five weeks. Individual correlations ranged from .05 to .81, with a median correlation of .46.

THE PERMANENCE OF SOCIAL AND MECHANICAL INTERESTS. The permanence of the social and the mechanical interests, as measured by the Minnesota Interest Inventory and scored with the Freyd Social-Mechanical Interest Scoring Key, has been studied by Hubbard. (*19, 20*) The fact that Freyd's Social-Mechanical Interest Scoring Key failed to differentiate mechanical and social groups has little reference to the permanence problem studied here. The problem is whether or not, when an individual makes a certain score in the inventory, that score is permanent, or that these interest expressions are permanent.

Hubbard administered the Minnesota Inventory twice to one group of 67 male students with an interval of fifteen months, to a second group of 156 male and 193 female college students with an interval of one year, and to a third group of 285 male and 313 female college students with an interval between of six weeks. All were arts, science, literature, education, and business students. The correlation coefficients between the social-mechanical scores made at the two periods are shown in the Table XLIV.

TABLE XLIV. PERMANENCE OF SOCIAL-MECHANICAL INTERESTS (HUBBARD)

Groups	*Intervals*	*Correlation Coefficient*
67 males	15 months	.45
193 females	1 year	.49 ± .037
156 males	1 year	.64 ± .032
313 females	6 weeks	.47 ± .029
285 males	6 weeks	.52 ± .029

The average (mean) of these relationships is .51 (median, .49) with the average for the year period the highest.

In the scoring of these inventories the plus scores indicated the socially interested and the minus scores the mechanically interested. Do these individuals fluctuate on the two occasions of taking the inventory from the minus to the plus scores, and vice versa? Hubbard has worked this out for those who made a score of plus 2, or more, or a score of minus 2, or more, which includes about 45 per cent of the total group. Sixty-three per cent of the socially interested men and seventy-two per cent of the socially interested women remained in the socially interested group over the six weeks' period. Sixty-seven per cent and seventy-three per cent respectively remained in the socially interested group over the year period. Fifty-eight per cent of the mechanically interested men and thirty-four per cent of the mechanically interested women remained in the mechanically interested group over the six weeks' period and fifty-six per cent of these men and twenty per cent of these women remained over the year period. The average (mean) for the six weeks' period is fifty-seven per cent (median, 61%). The average (mean) for the year period is 54 per cent (median, 62%). These per cents may be interpreted as the chances in 100 of these social or mechanical interest scores remaining social or mechanical interest scores under the conditions of the measurement.

Hubbard (*21*) has made two further studies of the permanence of mechanical interests. Using her Social-Mechanical Interest Scoring she found a correlation coefficient of .29 between the scores made on two occasions separated by one

year and three months for 150 boys. A new scoring key was later devised by Hubbard (*21*) in which the symbols of like, dislike, and indifference were given scores of 0 to 3 in the order of their significance in predicting mechanical ability. Using this scoring key she found a correlation coefficient of .40 between the scores on two occasions separated by fifteen months for 100 high school boys. Scored with Hubbard's Social-Mechanical Interest Scoring Key, the correlation coefficient between the two occasions was .34. In these investigations the permanence of social-mechanical interests over a period of one year and three months is represented by correlations of .29, .34, and .40.

Strong and MacKenzie (*42*) have studied the permanence of interests among two professional groups. Strong's "Vocational Interest Blank" was administered to the two groups, composed of 61 ministers and 32 C.P.A.'s on two occasions separated by one and one-half years. All of the subjects were of mature professional status and some of them were well along in years.

Fifty items evenly distributed through the blank were used to determine the percentage of permanence. The ministers shifted from liking the items, or disliking the items, to indifference, or reverse, in 26 per cent of the cases. They reversed their interest from like to dislike or dislike to like in 3 per cent of the cases. That is to say, there was a 71 per cent permanence in these interests over a period of a year and one half. The authors point out that on a chance basis there would have been a 32 per cent permanence of these interests. Personality items were changed proportionately greater and amusements and school subjects proportionately less. Data for the certified public accountants correspond closely to the ministers. This profession shows a shift of interests from like or dislike to indifference, or the reverse, in 24 per cent of the cases. They reversed their interests from like to dislike, or dislike to like, in 5 per cent of the cases. That is to say, there was a 71 per cent permanence in these interests.

Correlations worked between the scores (using professional scoring keys) for these two professional groups are shown in Table XLV.

TABLE XLV. PERMANENCE CORRELATIONS FOR PROFESSIONAL INTERESTS OVER 1½ YEAR PERIOD (STRONG AND MACKENZIE)

Professional Groups	*Scored with Ministers' Scoring Key*	*Scored with C.P.A. Scoring Key*
Ministers	.75 ± .04	.77 ± .04
C.P.A.'s	.81 ± .04	.74 ± .06

A correlation of .75 is shown to exist for both professional groups when scores in interests of own profession are compared for the two occasions separated by one and one-half years.

THE PERMANENCE OF INVENTORIED INTERESTS. Work upon the permanence of subjective interests which are measured by the interest inventory has but just begun. Conclusions from the present inadequate evidence are most tentative. Hubbard (*19, 20, 21*) has carried the analysis of the problem farther than anyone else, and she has worked out the permanence to be expected for high scores in interests.

For the most part, two methods have been used in measuring the permanence of inventoried interests: (1) the percentage of the items in the inventory the same on the two occasions is used as the measure and (2) a correlation between the scores of individuals (scored by a certain scoring key) on two occasions is used as the measure. The former method would seem to be a repetition of the method used in determining the permanence of interest estimates, only the estimates of the inventory, of course, are in greater detail. The method of comparing scores in group interests is new with the interest inventory. Its use, of course, depends upon the development of scoring keys. The two methods would seem to be essentially a measure of the same thing.

A summary of the evidence has been collected in Table XLVI. There is the suggestion here, as in dealing with the estimated interests, that interests become more permanent with age, experience, and professional development.

A COMPARISON OF ESTIMATED AND INVENTORIED INTERESTS FOR PERMANENCE. It is very difficult to secure any basis for the comparison of the permanence of estimated and inventoried

TABLE XLVI. PERMANENCE OF INVENTORIED INTERESTS (SUMMARY TABLE)

	Period Investigated	*Investigator*	*Per Cent of Permanence*	*Correlations Indicating Permanence*
Elementary School Period	15 months	Hubbard	..	.29
High School Period	15 months	Hubbard	..	.34
	15 months	Hubbard	..	.40
College Period	1 week	Fryer	83	..
	3 weeks	Fryer	75	..
	5 weeks	Shuttleworth	62	.46
	6 weeks	Hubbard	..	.52
	6 weeks	Hubbard	..	.47
	1 year	Gaw	..	.50
	1 year	Hubbard	..	.64
	1 year	Hubbard	..	.49
	15 months	Hubbard	..	.45
Adult Period	18 months	Strong & MacKenzie	71	.75
	18 months	Strong & MacKenzie	71	.74

interests. Hubbard (*20*) has shown the extent to which those with extreme social and extreme mechanical scores move out of that group in their interests in one year's time. Franklin (*9*) showed the extent to which high school students moved from one of fifteen occupational groups into others in a period of one year. A comparison of these two studies is made in Table XLVII.

TABLE XLVII. COMPARISON OF PERMANENCE OF ESTIMATED AND INVENTORIED INTERESTS

Groups	*Per Cent of Permanence* *Males*	*Females*
Estimated Interests of High School Students (Franklin)	62	71
Inventoried Interests of College Students (Hubbard)	67	73
	56	20

In this comparison of permanence of estimated and inventoried interests all the influences would appear to be in favor of the

inventoried interests. Yet the inventoried interests do not appear to advantage in these measures of permanence.

Referring to Table XLVI and to Tables XXXI, XXXII, and XXXV a rough comparison of permanence can be made. Results for the elementary and high school periods are more numerous for the estimated interests, while results for the college period are more numerous for the inventoried interests. Most of the inventory results for the college period cover far too short a time to be of any value in the comparison. The suggestion is present, however, that estimated and inventoried interests have a similar degree of permanence.

Methods of comparison vary greatly, but taking a year period as a standard, the evidence for both estimated and inventoried interests would seem to indicate that there is an increase in permanence throughout elementary school, high school, and college, and that interests have a little better than a 50 per cent chance, possibly a 60 per cent chance, of remaining permanent at these times. The records for estimated interests do not go beyond the college period. Strong's results for inventoried interests of older professional workers indicate an increase with age so that the degree of permanence may be expected among adults to be as high as 70 per cent.

THE DEVELOPMENT OF SUBJECTIVE INTERESTS (SUMMARY). There is one outstanding conclusion, which is in the background of all the research reviewed in this chapter. *There is a genetic development of interests.* But this development is not of a kind that will allow for the prediction of future interests for the practical purposes of vocational guidance. Interest development appears almost kaleidoscopic in form, it is ever changing its focus. Specific vocational interests are likely to change in a year's time. Vocational interest trends go through a gradual process of change and are likely to be quite different in later adolescence to what they were in early childhood. When all this has been said, however, there is permanence or stability of interests, as indicated in every study, to a surprising degree. It is made clear that what have been one's vocational interests in the past are the foundation of one's present interests.

The fluctuations in the developments of interests have been

emphasized throughout this chapter to counteract prevalent conceptions in vocational guidance of the prediction of future interests. It is seen from the quantitative facts that the prediction of future interests has had unwarrantable emphasis. These ideas of interest prediction have been borrowed from the field of ability measurement. Based upon the newer point of view guidance conceives of interest development as a whole. Specific interests are important as they hold a place in the total development of vocational interests. Guidance would emphasize a broadening development of interests as well as noting the leading trends. Abilities would be a factor in deciding upon the stimulation that would bring this richer development about. But an adequate interest development should be held most important in order that the individual might have a selective basis for the time when he will make definite vocational choices in the field of occupations.

This chapter is a survey of what has been considered important in the development of subjective interests. With the knowledge brought to light of the nature of the genetic development of interests it would seem that the future is likely to be concerned with determining the absence of interest development as well as its presence in the genetic interest history of the individual. That the development of interests is not so clear-cut as is the development of abilities is to be expected. If it were not so, life would lose a great deal of that variety that makes life interesting.

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CHAPTER VI

THE RELATION OF VOCATIONAL INTERESTS TO ABILITIES

EVERY parent recognizes the problem of vocational adjustment which develops when his child is compelled to coordinate interests and abilities. A never-failing topic of conversation among the older members of any social group is the question of the relation between the abilities of the young people of the community and their vocational ambitions.

It would seem that almost all people, old and young alike, wish to do things they cannot do, because of lack of abilities or lack of opportunities. A modern employment manager would consider himself an extravagant idealist if he accepted an applicant for the one reason that the applicant was interested in the job. The college personnel officer, who is faced with the problem of giving the best students the opportunity of a college education, has long since learned to harden his heart to the pathetic applicant who "wants to be a doctor," but who has just succeeded, by dint of hard work and sympathetic appeals to his teachers, in graduating with a bare passing grade from high school. In the observations of practical workers in the guidance and selection problems of industry and education, the relationship between abilities and interests is not high.

Yet, on the other hand, every industrialist, and every personnel worker, and every teacher, thinks of interests as extremely important and necessary to success. Without interests, work is colorless and drab; with interests, work seems worthwhile to the individual, abilities are developed, and achievements are realized. Abilities, when coupled with interests, spell success. At least, so runs the practical conception of the personnel office.

EARLY HISTORY OF THE PROBLEM. Early students of the problem, about 1910-1920, were greatly concerned with the

relation of subjective interests and abilities. The statement by a person that he was interested in a certain job, a course of training, a particular career, was regarded as significant evidence of ability for this work by many who dealt with the educational and industrial problems of personnel selection and guidance. Educators had said that an interest is necessary to pleasurable effort and that through interest success becomes more probable. This had been interpreted to mean that the verbal expressions of interests are indicative of abilities. The theory that interests are predictive of abilities has been widely used in building up the practical procedures of both the employment office and the guidance bureau, although some workers were early concerned with how much weight should be given to these estimates of interest.

The problem was formulated for investigation some fifteen years ago. Thorndike (*27, 28*) gave scientific prestige to the view that interest expressions are indicative of abilities, by establishing a relationship of .89 between educational interests and self-estimated abilities. Practically, however, the theory fell down under the test of personnel workers, and Kitson (*15, 16*) voiced the experience of personnel executives and vocational counselors on occasions, in the following manner:

> One important objection to the reliance upon interest in vocational guidance is that interest in a vocation is not always associated with capacity to perform the tasks or to acquire the skill necessary for success in the calling. Occupations are crowded with people whose interest is intense and fervid, yet whose ability is undeniably deficient. (*16,* 354)

The early conceptions of this problem succeeded in dividing the practical workers into two camps, one which believed interests to be material from which to predict abilities and the other which conceived them to be of little practical significance when it came to selecting the work in which a person would do his best. The research will be separated into those investigations that deal with the interest estimates by the individual and those investigations which make use of the interest inventory in securing a measure of the individual's subjective interests.

THE RELATION OF INTEREST ESTIMATES TO ABILITIES. Investigations into the relation of vocational interests and abilities has been carried on by the author among several educational and vocational groups. Estimated interests were secured by the questionnaire method for three periods of educational development: elementary school, high school, and college, among a mixed group of 65 students in a western college and a group of 67 women in an eastern college. (7) Abilities were measured by The Army Alpha intelligence examination. To compare the vocational interests and abilities, the estimated vocational interests were rated according to the average intelligence of workers already in these occupations.[1] The percentage of the groups having more, or less, intelligence than that required by their vocational interests is shown in Table XLVIII. If the intelligence of the subjects was within one and one-half years (mental age) of the intelligence requirement of the vocational interests it was considered that this represented an approximation of interests to abilities. The table shows the percentage of individuals of more, or less, intelligence than is called for by their vocational interests.

TABLE XLVIII. PER CENT OF COLLEGE GROUPS BY EDUCATIONAL PERIODS WITH MORE OR LESS INTELLIGENCE THAN REQUIRED BY VOCATIONAL INTERESTS (FRYER)

Educational Periods	*Groups Studied*	*Per Cent with* MORE *Intelligence Than Required by Interests*	*Per Cent with* SAME *Intelligence as That Required by Interests*	*Per Cent with* LESS *Intelligence Than Required by Interests*
Elementary School	Western	88	11	1
	Eastern	54	39	7
High School	Western	75	22	3
	Eastern	57	32	11
College	Western	59	38	3
	Eastern	45	50	5

[1] Occupational-intelligence norms, with slight modifications, were used for this rating, as published by the author in "Occupational-Intelligence Standards," *Sch. and Soc.*, 1922, XVI, 273-277.

For the western group, eighty-nine per cent for the elementary school period, seventy-eight per cent for the high school period, and sixty-two per cent for the college period would have been misplaced in their vocational interests, according to their intelligence scores. For the eastern group, the situation is similar, but in lesser degree: sixty-one per cent for the elementary school period, sixty-eight per cent for the high school period, and fifty per cent for the college period would be maladjusted vocationally on the basis of their intelligence if placed in their occupational interest.

It is interesting to note a general increase in ability adjustment by interests among these two college groups, paralleling advancement in education. The western group progresses from 11 per cent for the elementary school period, to 22 per cent for the high school period, to 38 per cent for the college period. The eastern group has 39 per cent, 32 per cent and 50 per cent respectively.

The data secured for the elementary school and high school periods were given in retrospect by these two college groups. Also, it can be considered as only representative of those individuals who go to college. Corrections for the high school period are offered in results secured from 806 high school boys and girls by Proctor (*22,* 63-67) and for the elementary school period in results secured from 512 elementary school graduates by Feingold (*4*). Fifty-nine per cent of Proctor's subjects and forty-six per cent of Feingold's subjects had the same intelligence as that required by their vocational interest (Table XLIX).[2]

TABLE XLIX. PER CENT WITH MORE OR LESS INTELLIGENCE THAN CALLED FOR BY VOCATIONAL INTERESTS (PROCTOR AND FEINGOLD)

	More	*Same*	*Less*
Proctor's Study of 806 High School Pupils ..	18	59	23
Feingold's Study of 512 Elementary School Graduates	7	46	47

It is probable that Feingold's and Proctor's studies, which show a higher interest-ability adjustment, are most representa-

[2] The methods used in securing these figures were the same as those in the previous study of college students. (*7*)

tive of the elementary and secondary school periods. The average (mean) of the results of eleven, thirty-nine, and forty-six per cent for the elementary school period is thirty-two per cent who approximate a correct ability adjustment in their interest (median 39 per cent). The average (mean) of the results of twenty-two, thirty-two, and fifty-nine per cent for high school (other than at graduation) is thirty-eight per cent approximating correct choice (median 32 per cent). The average of the results of thirty-eight and fifty per cent for the college period is forty-four per cent (mean and median) approximating a correct ability adjustment. The fact that the relationship for college students is not higher has in part an extraneous cause. College students are of an intelligence not required by most of the occupations of society. A chance selection of an occupation would be less likely to place the college student in an occupation suited to his general qualifications than would be the case for the high school student, and even much less likely than would be true for the elementary school graduate, because of the preponderance of occupations requiring average, rather superior, intelligence.

A group of advanced vocational students show an interest-ability adjustment somewhat higher (7) than would be expected. Sixty-seven per cent have interests in line with their intelligence in elementary school, fifty-three per cent in high school and seventy-four per cent in vocational school. This group totaled only fifteen, but it is suggestive of what may be expected in special training groups. It would seem that these individuals already had been selected on the basis of their abilities. College has dropped them or refused them because of their inability to carry collegiate work, and they have gravitated into training for which they have ability. In ninety-three per cent of the cases the vocational ambition of these subjects was the one for which they were in training. It is to be expected that considerable interest will be manifested in the vocation for which one is in training. Hence, a closer approximation of vocational interests and vocational abilities with special vocational groups, particularly those in training, would be expected.

The relation of interests and abilities among vocational

groups at work is a somewhat different problem. These individuals are evidently less ignorant of the requirements of various occupations than the members of educational groups. To make this test of the prediction of abilities by vocational interests, three hundred and twenty young men, already employed and having shown evidence of giving some thought to their vocational problems by applying at a bureau for vocational counsel, were asked, before the vocational counseling process was begun, to state as exactly as possible their vocational interests. (*6*) Such vocational interests were estimated by only 31 per cent of the subjects, indicating that these individuals did not have very definite vocational interests. (Their intelligence scores averaged approximately the same as those that would be expected from college freshmen.) Those who did not give a definite preference frequently stated that they were unable or unwilling to make a choice on the basis of what they knew of themselves or of the occupational world. These responses are, it will be recalled, from men already employed, who should possess a fair knowledge of the occupations.

Interests and abilities were compared in the same manner as already described for the college groups. Forty-one per cent of these individuals had interests requiring less intelligence than they possessed. Forty-four per cent had the same, and fifteen per cent had vocational ambitions requiring more intelligence than they possessed. For those in occupations, between the ages of twenty and thirty years, it seems probable that about forty-four per cent will approximate their abilities, as measured by intelligence tests, in the requirements of their vocational interest.

SUMMARY OF RESULTS. When all the results of studies reviewed here are assembled, 1,816 cases in total, forty-nine per cent of the individuals are found to possess intelligence within one and one-half years (mental age) of the requirement of their vocational interests. These individuals, almost half the total, are considered to approximate a correct vocational choice when judged by the requirements upon intelligence made by their vocational interests. An interpretative summary of the results for the separate periods of activity for which data were secured, is shown in Table L. This table offers figures that

may be viewed as chances in one hundred of approximating correct vocational choice.

TABLE L. PER CENT OF APPROXIMATION BY THE VOCATIONAL INTERESTS OF A CORRECT VOCATIONAL CHOICE AS MEASURED BY INTELLIGENCE TESTS (INTERPRETATIVE SUMMARY)

Periods	*Per Cent Approximating Correct Choice*
Elementary School (later years)	30
High School (other than at graduation)	40
College (other than at graduation)	45
In Occupation (between ages of 20 and 30)	45
Vocational School (requiring high school graduation)	75
Average for all Groups	50

THE CORRELATION COEFFICIENTS FOR THESE STUDIES. The probable relation for elementary school students between the two variables: (a) the subjects' intelligence, and (b) the intelligence requirement of the occupational interests, is represented by correlations for the college groups of $-.17 \pm .09$ and $.22 \pm .08$. (*7*) As the data upon which these results are based were secured in retrospect from college students, their representation of ordinary elementary students may be questioned. Feingold's (*4*) investigation of elementary school graduates gives the correlation for boys as $.05 \pm .04$ and for girls $.10 \pm .04$. It is probable that the usual relationship for elementary school subjects is not much higher than .10.

For high school students the relation is expressed by correlation coefficients for the college groups of $-.20 \pm .09$ and $.08 \pm .08$. (*7*) The data upon which these results are based are subject to the same criticism as that secured from these college groups for the elementary school period, but in lesser degree. A correlation worked from Proctor's data (*22*) gives this relation as $.21 \pm .02$, which makes it probable that the usual relation for high school students is seldom better than .20.

For college students there are the two correlations of $-.22 \pm .08$ for the eastern group and $.06 \pm .08$ for the western group. (*7*) Using school grades as the criteria of abil-

ity instead of intelligence of the students, a coefficient of $-.11 \pm .09$ is found for the eastern group. It is probable that the usual relation between abilities and vocational interests for college students is not higher than .10.

For those students in advanced vocational school (*7*) there is a correlation coefficient of $.58 \pm .10$ between intelligence and the intelligence requirement of the vocational interests and for those in the occupations (*6*) there is a correlation of $.38 \pm .06$.

It would appear that the usual relationship between the subjects' intelligence and the intelligence requirement of the occupational interests, is expressed by the following correlation coefficients:

For elementary school (later years)	.10
" high school (other than at graduation)	.20
" college (other than at graduation)	.10
" advanced vocational school	.60
" occupational work (ages 20-30)	.40

IMPORTANCE OF INTERESTS AT DIFFERENT MENTAL LEVELS. Heretofore, we have dealt with the relation of interests to abilities at different chronological ages or educational levels. It is possible to indicate the relation between interests and abilities at different mental levels. To do this the subjects used in the studies already mentioned (*4, 6, 7, 8, 22*) have been assembled into intelligence groups. Into this large group were thrown records of individuals of freshman high school status along with adults. Thus the measure is a rough one, because the intelligence level of each individual could not be exactly determined.

The vocational interests approximate in their intelligence requirements the intelligence of the subjects to the extent shown by the percentages in the last column of Table LI. Mental levels are given in mental age and Army Alpha scores. A correct vocational choice is, of course, one in which the requirements of the individual's vocational interest is within one and one-half years mental age of his own intelligence.

The probability that individuals in the various intelligence groups will choose vocations with requirements similar to

their own intelligence is suggested by the percentages in the last column of Table LI: There is a progressive increase commencing at the ninth year with zero per cent approximating a correct ability choice up to the sixteenth year, with seventy-two per cent. At the seventeenth year there is a decline with sixty-three per cent approximating a correct choice and at the eighteenth year, thirty-nine per cent. The explanation of this decline would seem to lie in the difficulty that high-grade intelligence has in finding a satisfactory outlet in the occupations, the difficulty that was evident in the college student group.

TABLE LI. RELATION BETWEEN INTELLIGENCE OF INDIVIDUALS AND VOCATIONAL-INTEREST REQUIREMENTS UPON INTELLIGENCE FOR VARIOUS MENTAL LEVELS

Intelligence Groups		*No. of Cases*	*Per Cent Making Correct Vocational Choice on Basis of Intelligence*
Mental Age	*Alpha Scores*		
18 and over	135 and over	333	39
17 to 17-11	120 to 134	269	63
16 to 16-11	105 to 119	310	72
15 to 15-11	90 to 104	302	52
14 to 14-11	75 to 89	226	54
13 to 13-11	60 to 74	149	11
12 to 12-11	45 to 59	49	10
9 to 11-11	0 to 44	10	0
All intelligence groups		1816[3]	49

With the exception of the decrease at these upper intelligence levels, *higher levels of intelligence* appear to be correlated with *correct ability choices*. The chances that an individual above eighteen years mental age will make a correct choice is 39 in 100; the chances that an individual of sixteen years mental age will make a correct choice is 72 in 100. For the individual of fourteen years mental age it is 54 in 100 and for the individual of twelve years mental age there are 10 chances in 100. Feingold (*4*) points out as a result of his investigation "that the lower an individual stands in mentality the higher seems to be his vocational ambition." The figures here

[3] All cases included in the total are not distributed according to mental age.

would indicate that the lower an individual is in mental age the more he is likely to be in error in vocational interests, when that error is measured in intelligence requirements of the vocational interest.

A PRACTICAL TEST OF THE PREDICTION OF ABILITIES. A practical test of vocational interests as criteria for the prediction of abilities is found in a comparison of the vocational interests with the actual occupations in which the individuals expressing these interests are at work. (*6*) Here the same method of measuring adjustment has been used as before. The occupation (interest or actual occupation) is considered the same in its requirement upon intelligence as the individual's intelligence when within one and one-half years mental age.

The results from 320 case histories of vocational counsel subjects actually engaged in the occupations are presented in Table LII.

TABLE LII. COMPARISON OF ABILITY ADJUSTMENT BY ACTUAL OCCUPATIONS AND OCCUPATIONAL INTERESTS (FRYER)

Per Cent with	*Occupational Interests*	*Actual Occupations*
More intelligence than required	36	50
Same intelligence as required	49	40
Less intelligence than required	15	10

Fifty-one per cent of the group of 320 individuals applying for vocational counsel at a bureau in New York City would be maladjusted in abilities if placed according to their occupational ambition. On the other hand, if left in the actual occupation, sixty per cent would be maladjusted on this same basis. The correlation between the intelligence of subjects and intelligence requirement of actual occupations, is .42, while between intelligence of subjects and intelligence requirement of the desired occupation it is .38.

In answer to the question: which is the more significant as a criterion for vocational selection or guidance, in placing the individual in work adjusted to his intelligence, the vocational interests or the actual occupations, there appears to be no great difference. The actual and the desired occupations seem about equally good in predictive significance.

ALLIED STUDIES INDICATING THE RELATION OF INTERESTS AND ABILITIES. Measures of the ability of 31 college students in six tests of intelligence and their ranking of these six tests in interest upon completing the six different tasks have been compared in an investigation by Hartman and Dashiell. (*11*) An average correlation of .40 was found to exist between estimated interests and measured abilities.

Poull (*21*) has studied the occupational interests of 1,206 elementary school children from a workingman's neighborhood of mechanics and skilled trades in New York City. When these children chose vocational interests in the skilled trades and mechanics, which were the occupational fields of most of their parents, they approximated in their intelligence the requirements of the occupation. With the fairly high correlations found between intelligence of parents and of offspring and between social status and intelligence, a close approximation of intelligence by the requirements of vocational interests would be expected in these fields. But when these subjects chose clerical or professional work, as about fifty per cent of them did, it was found that the distributions of the children's intelligence were about 25 per cent lower than the distribution of the intelligence requirements for clerical work and about 50 per cent lower than for the professions.

Uhrbrock (*29*) had 253 male college students estimate their general interest trend in one of the three following fields of vocational activity: things, people, ideas. He then administered the Thorndike Intelligence Examination as a measure of "abilities with ideas" and the Stenquist Mechanical Aptitude Test No. 1 as a measure of "abilities with things." Twenty-one per cent of the 253 students estimated their interests as being "in ideas," forty-two per cent as "in things," and thirty-seven per cent as "in people." These three groups made the average (mean) scores upon the two ability measures which are shown in Table LIII. The comparison is between the interest groups upon either of the abilities tests. No significant differences, which are three times the standard deviation of these differences, appear. But those interested in ideas tend to make slightly higher scores, as would be expected from previous studies, in the measure of abilities with ideas. Those

interested in things tend to make a slightly higher score in the measure of abilities with things than do those interested in ideas or people.

TABLE LIII. AVERAGE SCORES OF INTEREST GROUPS IN "ABILITIES WITH IDEAS" AND "ABILITIES WITH THINGS" (UHRBROCK)

Groups with	*Abilities with Ideas (Thorndike's Test)*	*Abilities with Things (Stenquist's Test)*
Interests in Ideas	68.7	73.2
Interests in Things	64.8	80.2
Interests in People	61.0	71.8

Terman and his co-workers (*26,* 373-377) have studied the relation to ability of the occupational interests of 643 gifted and 527 normal children by a ranking of these interests with the Barr Scale.[4] The average Barr Scale ratings for the vocational interests of these groups are shown in Table LIV.

TABLE LIV. AVERAGE BARR SCALE RATINGS OF GIFTED AND NORMAL GROUPS (TERMAN)

Groups	*Average (Mean) Barr Scale Rating*
Gifted Boys	15.4
Gifted Girls	13.9
Normal Boys	12.7
Normal Girls	12.6

The average gifted boy is said to be looking forward to an occupation which presents the intellectual difficulty represented by the occupation of high school teacher, minister or industrial chemist. The average normal boy is looking forward to an occupation of the difficulty of nurse, chef, or landscape gardener. There is the suggestion here of some relationship between vocational interests in their demands upon intelligence and the intellectual levels of the two groups. A comparison of the average Barr Scale rating of the vocational interests of the two groups with the average Barr Scale rating of the fathers' occupations suggests that the gifted group is more

[4] The Barr scale is an occupational-intelligence scale composed of average (mean) rankings by 20 judges of 121 occupations according to demands upon intelligence.

adjusted in their interests than the normal group. The average ranking of the fathers of the gifted is 12.77 and that of the gifted children's interests is 15.4 for the boys and 13.9 for the girls. The average ranking of the fathers of the normal is 8.8 and that of the normal children's interests is 12.7 for the boys and 12.6 for the girls. There is less distance between the occupational ambitions of the gifted children's interests and the occupational status of the fathers. This is evidently the relation already noted (Table LI) between *higher mental levels of intelligence and correct ability choices.*

THE RELATION BETWEEN ESTIMATED INTERESTS AND ABILITIES (SUMMARY). The facts are quite clear regarding the relation of estimated interests and abilities as measured by intelligence tests and other general measures.

1. Individuals are, on the average, interested 50 per cent of the time in occupations for which they have abilities. The degree of relation, of course, is influenced by the number of occupations there are that require about the same intelligence as that of the subject. While interests and abilities often fit together in the mental life of the individual the prediction of an ability adjustment from estimated vocational interests is, on the average, at about a 50-50 basis.

2. There are differences in the value of the vocational interest estimate in predicting an ability adjustment for various groups of people. This is true for groups formed according to educational development. The predictions of correct adjustment for educational groups according to their estimated interests are shown in Table LV.

TABLE LV. PREDICTION FOR EDUCATIONAL GROUPS FROM ESTIMATED INTERESTS OF OCCUPATION FOR WHICH INDIVIDUAL HAS INTELLIGENCE REQUIREMENTS

Educational Groups	*Chances in 100 for the Prediction*
In Elementary School (later years)	30
In High School (other than at graduation)	40
In College (other than at graduation)	45
In Occupations (between 20 and 30 years of age)	45
In Specialized Vocational Schools (requiring high school graduation)	75

These figures show the probability that a person will possess the intelligence required by the occupation which he estimates as his vocational interest.

3. Differences also exist for various mental levels in the value of the estimated vocational interest in predicting an ability adjustment (Table LVI).

TABLE LVI. PREDICTION FOR MENTAL AGE GROUPS FROM ESTIMATED INTERESTS OF OCCUPATIONS FOR WHICH INDIVIDUAL HAS INTELLIGENCE REQUIREMENTS

Mental Age Groups	*Chances in 100 for the Prediction*
All ages	49
9-11	0
12	10
13	11
14	54
15	52
16	72
17	63
18 and above	39

These figures show the probability that a person of a certain mental level will possess the intelligence required by the occupation which is his estimated vocational interest. Individuals of higher mental levels tend to estimate interests with intelligence requirements closer to their own mental age.

4. The practical value of vocational interests for prediction is illustrated by a comparison of the actual and desired occupations of individuals seeking vocational guidance. The occupation desired, the vocational interest, is found to have a value predictive of vocational abilities almost identical with that of the actual occupation in which the individual is at work. An occupation in which an individual would express his abilities to greatest advantage can, on the average, be predicted equally as well from the occupation in which he is engaged as from the occupation toward which he aspires.

5. These facts have profound significance for vocational selection and guidance. Interests and abilities are related in the individual as are all mental qualities, but to use one for

the prediction of the other is unwarranted. Theoretically it would seem that the relationship between vocational interests and abilities is as low as zero in the case of the very young child. It would seem to increase with knowledge—knowledge of the occupational world and of personal qualifications—through childhood, adolescence, and adult life. The relation in elementary school between the vocational ambition and intelligence should be lower than for the high school period. In turn, if the occupational world offered an outlet for superior abilities equal to that which it offers for average abilities, the relation in college between vocational interests and intelligence should be higher than in elementary school and high school. That this is not true is probably due to the preponderance of occupations demanding inferior intelligence. The evidence from those in advanced vocational schools and in the occupations indicates that they are at the top, as would be expected on the basis of knowledge, in the relationship between interests and intelligence. One's mental level irrespective of age would, of course, have something to do with the relation expected. The "top," however, is a relationship which would not justify the use of vocational interests as an important criterion for the prediction of an ability adjustment.

6. The measures used in the studies of the relation of estimated interests and abilities have been measures of general abilities and not of achievement. The comparisons have usually been between requirements in intelligence of the estimated vocational interests and a measure of the subject's intelligence. It is possible that a comparison of interests with achievement would show a different relationship. This relation between interests and achievement, particularly of educational achievement, has become the more important problem of later research.

INVENTORIED INTERESTS. Problems similar to those already considered have been studied with the interest inventory. This research is separated from that which has gone before because it is not known exactly how similar are the two measures of estimated and inventoried interests. It is generally agreed, however, that inventoried interests are a more valid measure of subjective interests.

THE RELATION OF INVENTORIED INTERESTS AND INTELLIGENCE. The relation of inventoried interests and intelligence has been studied by Kornhauser. (*17*) A correlation was found for 108 college students of .29 between scores in Kornhauser's General Interest Inventory and scores in the Otis General Intelligence Test. This correlation is spuriously high, because in this group of 108 students 45 were used in making the scoring key which was based upon a division of successful and unsuccessful students.

Remmers (*24*) has worked out the relation between scores on the Psychological Examination (1927 ed.) of the National Council on Education, and the Purdue Interest Report Blank for agricultural and engineering students (Table LVII).

TABLE LVII. CORRELATIONS BETWEEN SCORES IN INTEREST INVENTORY AND SCORES IN INTELLIGENCE TEST (REMMERS)

	No.	*Correlation Coefficient*
Agricultural Students	78	.42 ± .06
Engineering Students	74	.19 ± .08

These correlations are interpreted as the order of agricultural interests *vs.* intelligence scores and the order of engineering interests *vs.* intelligence scores.

The facts are not at all conclusive regarding the relation of inventoried interests and intelligence. There is the suggestion that low correlations would be expected between measures of interests and intelligence. Theoretically it would seem that there should be low correlations between these two qualities, based upon the assumption that they are different measurable qualities in mental life. The presence of any relationship then would be explained as due to a common factor in all mental activity. It might also be due to the fact that the two measures overlap in their specific measurement of the two fields.

INVENTORIED INTERESTS AND THEIR RELATION TO MECHANICAL ABILITIES. An extensive investigation of mechanical interests has been carried on by Hubbard. (*12*) The purpose behind this study was the development of interest scoring keys for the prediction of mechanical abilities in the individual.

The study may be regarded also as one of relationship between mechanical interests and mechanical abilities. Hubbard used her Interest Analysis Blank for Boys and devised a scoring key of mechanical interests, using as her primary group 100 seventh-grade boys. Her criteria of mechanical interests were mechanical abilities. The 100 boys were ranged in ascending order, according to a score made up from shop operations and mechanical information. The items of the inventory were then scaled for the scoring key, according to their significance in predicting mechanical abilities.

The inventories of these 100 boys making up the primary group were scored with Hubbard's scoring key. A correlation coefficient of .66 was found between the mechanical interest scores and the mechanical ability scores. It will be recalled that the scoring key was made to parallel in its rating the scores in mechanical abilities. Hence this correlation should be interpreted as indicating the degree of perfection of the scaling. It is not a measure of the relationship between mechanical interests and mechanical abilities.

Hubbard has determined the relation of the interest scores to the scores made by these 100 boys in the Minnesota Mechanical Abilities Test. Correlations between the interest scores and the mechanical ability scores are shown in Table LVIII.

TABLE LVIII. RELATION BETWEEN MECHANICAL INTEREST SCORES AND SCORES IN MINNESOTA MECHANICAL ABILITIES TEST FOR 100 BOYS FORMING PRIMARY GROUP (HUBBARD)

	Correlation Coefficient
Interest Scores with Card Sorting	0.09
Interest Scores with Packing Blocks	0.12
Interest Scores with Spatial Relations (Formboard)	0.46
Interest Scores with Minnesota Assembly Test	0.42
Interest Scores with Paper Formboard	0.39
Interest Scores with Battery of Last Three Tests Above	0.57

Several of these correlations indicate significant relationships. Are they relationships between interests and abilities? The different tests making up the Minnesota Mechanical Ability Test battery were developed upon shop criteria (with other

groups, of course). They correlate with shop criteria .19 to .55, and the battery .66. It will be recalled that the interest scores for the group of 100 boys were determined by their relation to shop criteria. Hence, a fair relationship would be expected between the interest scores and the Mechanical Ability Test scores, because both interest scores and abilities scores are determined by shop operations. The situation is something like this: Mechanical ability scores equal shop operations; mechanical interest scores equal shop operations; therefore, mechanical ability scores are equivalent to mechanical interest scores. Of course, the relationship is not perfect, nor is it high, but an influence is there. This relationship (Table LVIII) is not one between measures of mechanical interests and mechanical abilities.

A crucial test of the relationship of mechanical interests and mechanical abilities can be made when mechanical interest scores are compared with mechanical ability scores for a control group. Hubbard administered her Interest Analysis Blank for Boys to a number of control groups and scored with her Scoring Key of Mechanical Abilities.[5] Correlations (Table LIX) between scores in mechanical interests and scores in mechanical abilities are shown to be generally low.

These correlations indicate without the shadow of a doubt that mechanical interests have a low correlation with mechanical abilities. Hubbard's conclusions are as follows: "These mechanical interests can nowhere in any group at any level or for any test be depended upon to predict scores in mechanical tests." (*12*, 238-9) This is a conclusion based upon a careful statistical analysis. The order of interests varies differently from the order of abilities. The two orders are set together for the primary group. For the control groups the order of abilities and the order of interests are found to be different. The indication is that mechanical interests and mechanical abilities are not closely related and that mechanical abilities cannot be selected by interest scores no matter how the scoring is determined. This work by Hubbard was done in connection with the investigation at the University of Minnesota of tests of mechanical abilities (*20*). A large number of cor-

[5] See Appendix III.

TABLE LIX. CORRELATIONS BETWEEN MECHANICAL INTEREST SCORES AND MECHANICAL ABILITIES SCORES (HUBBARD)

Control Groups			*Mechanical Ability Tests*			
	Grades	*No.*	*Test of Spatial Relations*	*Minnesota Assembly Test*	*Paper Formboard Tests*	*Mechanical Abilities Battery of Tests*
Bryant Junior	7	201	—	—	—0.07	—
Jefferson Junior	8	66	0.09	0.23	—0.01	0.15
Bryant Junior	8	252	—	—	0.17	—
Jefferson Junior	9	55	0.24	0.28	0.22	0.32
Bryant Junior	9	182	—	—	0.13	—
West High School	10	36	0.23	0.05	0.25	0.26
West High School	11 and 12	86	0.30	0.30	0.23	0.35
University College of Science, Literature and Arts	14	46	0.30	0.05	0.33	0.26
University College of Engineering	13	129	0.09	—0.11	0.03	0.00
St. Paul Vocational School	First year	153	—	—	0.12	—
Both junior high schools	8	318	—	—	0.15	—
Both junior high schools	9	237	—	—	0.06	—

relations with various mechanical criteria were computed for the interest inventory in this study. All are low, which offers further evidence in support of the conclusion stated above.

HUBBARD'S SCORING KEY OF MECHANICAL ABILITIES. Hubbard's investigation (*12*) was based upon the theory that there are ability group interests and that the interest inventory can be scored for these. Her undertaking was similar to that of Cowdery and Strong, only these investigators scored the inventory for social group interests while she scored for the interests of mechanical ability groups. She assumes interests that will discriminate between groups of different levels and kinds of ability.

She aimed to develop a scoring key formed of the interests of a group superior in mechanical abilities, and second, to select those of superior mechanical abilities by the application of this scoring key. She found distinguishing interests between her primary groups of superior and inferior mechanical abilities. It is evident that almost any two groups will be found to possess distinguishing interests. For the control groups, however, the selection of those with mechanical ability was negligible, as shown by the correlations (Table LIX). The interests included in the scoring key did not vary in correspondence with the mechanical abilities. Hubbard's Scoring Key of Mechanical Abilities,[6] when validated upon control groups, was found not to fulfil its original purpose. The conclusion already drawn from this research—that interests are independent of mechanical abilities—involves the further conclusion that mechanical abilities cannot be predicted from interests.

INVENTORIED INTERESTS AND ABILITIES (SUMMARY). The conclusions reached in the study of the relation of estimated interests and abilities are supported when the interest inventory is used as a measure of interests. In fact, with the use of the interest inventory there appears to be less of a relationship between interests and abilities than was found when the interests were estimated. It is possible that this is because the interest inventory is more nearly a measure of interests as different from abilities than are the estimates. A partial estimate

[6] See Appendix III.

of abilities may be included in the estimate of interests. The search in mental measurement is for measures of independent psychological qualities. From this point of view low correlations between different measures are encouraging. The assumption is already being made in the development of interest measures that interests are qualitatively different from abilities.

The research with the interest inventory has been separated into two divisions, in one of which intelligence is considered the measure of abilities while in the other it is mechanical abilities that are studied.

1. The relation between inventoried interests and intelligence is negligible.

2. The relation between mechanical interests and mechanical abilities appears also negligible.

3. In fact, the research with the interest inventory, though limited and thus inconclusive, suggests that the relation between all interests and all abilities is so low that subjective interests cannot be used for the prediction of abilities.

4. The research upon the relation of abilities and interests suggests the conclusion that interests and abilities are different qualities in mental life. Neither one is dependent upon the other. Neither can be predicted from the other. This is valuable practical knowledge for the personnel and guidance office. However, there is yet the relation between interests and achievement or success to be determined.

THE INHERITANCE OF INTERESTS. There is a popular belief that interests are inherited. It is thought that we like or dislike, because of our inheritance, various stimulating objects and activities in our environment. The experimental evidence reviewed in this chapter is in general an answer to this problem.

Psychology views the mind of the child before it is stimulated by the objects of his environment as an utter blank as far as knowledge is concerned. The child could not know one object from another. An engine would not be known as an engine, nor an apple as an apple. This knowledge is all acquired. There is no knowledge inherited by the child that could stimulate interest or aversion.

But there is a sense in which interest in objects or activities seems to be inherited. There is a tendency on the part of the

child to be interested in objects which are bright, objects that give loud sounds, moving objects, and so on. Under certain stimulation there would be an averse reaction. It is, of course, impossible to secure from the child an expression of like or dislike of the stimulation, but interpretation from evidences of attention would lead one to conclude that a child is interested, before learning takes place, in this kind of stimulation.

One child, from the time that his hand and arm movements coordinate with eye movements, develops an obsession for a pencil, with which he scrawls on walls, books or other surfaces; another is in danger because of his passion for the bright shimmer of scissors; still another has no steadiness of interests, but grows tired of any object when it is safely secured. Watson has suggested that in these play preferences of the very young should be found material of value to the vocational counselor. While it is a stimulating thought that the baby in the crib is already giving evidence of the natural lines of his development, the hope of using these preferences for the guidance of the adult in the choice of a vocation is at present quite vain, and will in all probability remain so.

Long before she knew her letters a little girl carried books about with her, over which she would pore with every expression of interest, turning the pages with a delightful air of serious concern. She announced to her amused family that she was "as bookish as sister." Sister was much older, in college at the time, and very "bookish" as the child pointed out. Sister became a writer. The little girl is now in high school, and reported to be the "white hope" of her English teachers, already writing for the newspapers and winning prizes in short story contests. Did the books that she carried about instead of dolls forecast a special development of both capacity and interests in the field of literature? Or did she have the same inheritance as her sister, with the books a mere accidental choice of toy? Had there been no sister, would the child have clung to the books as beloved objects? Would she have turned to writing as a special field in which to seek rewards? These are the puzzling questions. It is probable that in the development of interests both inheritance and training play their part.

There is another sense in which interests seem to be inherited. It is in the development of verbal and motor coordinations. Those first reactions, of the voice, of the arms, of the legs, are they the ones most easily made, most possible in the child's equipment, those for which maturation has best prepared the child? These are reactions towards objects stimulating the child, of course, and these objects may become the interests of the child. The determination of interests in this manner takes its place among the inherited causes of interests.

But while a child reaches out for an object, a toy, a paper, or what not, the fact that this certain object is in his environment is a chance factor. He may be able to reach for some things and not others due to his inheritance, but the specialized nature of the object reached for is a chance factor of the environment.

It is for this reason that psychologists look upon interests as due to experience, as environmental in cause. It is the environment that determines the specialization of our interests. If we are brought up in a mining community, our interests are determined by that fact. For one brought up on board ship there is a different determiner. The interests of a certain person might have been in an entirely different field, and they may be developed in an entirely different field from that in which they are at present.

The evidence of vocational research bears out this conclusion of general psychology that interests are primarily of environmental origin. Interests, whether estimated or inventoried, appear to have a chance relation with abilities. To be interested in an occupation does not mean that one will have the abilities demanded by that occupation, that is, not to a degree necessary for prediction. But the fact that abilities do determine training necessarily brings interests along with it. If the individual moves about from one field to another, seeking work he can do, and upon finding work continues his training in that field, some interests are stimulated by that training and are linked, through training, with abilities. But the causative factor of interests is not necessarily abilities. During the process of adjustment, training has stimulated many other interests, in

various fields, all of which determine the low correlations reported between abilities and interests. Training and environmental factors, many of them chance stimulations, are the main cause of vocational interests.

THE RELATION OF INTERESTS TO TRAINING. While this conclusion has been stated that interests are caused by training, it is a negative conclusion based on the absence of proof that interests are of inherited origin. The positive proof that interests are determined to a large degree by the chance stimulations of the environment is not forthcoming. No work has been done upon this problem.

But the development of interests in a certain narrow professional field has been studied. In this situation the problem is one of measuring the influence upon the individual of a certain environment. It is a measure of what training or stimulation in one field of activities does to the interests of individuals. Cowdery (*1*) studied the interest scores of medical, engineering, and legal groups to see if there was a progressive increase according to advances in training. Administering his inventory to several groups which represented different degrees of training in these three professions, he scored each group with the professional scoring key of that group. Interests and training are compared for average scores in Table LX.

TABLE LX. COMPARISON OF TRAINING AND INTERESTS (COWDERY)

Groups Arranged According to Professional Training	*Average Professional Interest Score of Group (Mean)*
Medical Practitioners	49.7
Graduate Medical Students	49.1
Pre-Medical Students, Collegiate Grade	61.1
High School + College Students of Medical Preference	53.3
Engineers	125.4
Graduate Engineering Students	116.1
Pre-Engineering Students, Collegiate Grade	141.8
High School + College Students of Engineering Preference	154.7
Lawyers	108.9
Graduate Law Students	130.4
Pre-Law Students, Collegiate Grade	110.6
High School + College Students of Legal Preference	125.1

In none of these three professions is there an increase of professional interests corresponding to increase in training. The tendency is the other way, for those of less professional training to make higher scores in professional interests. The beginner in training would seem to be professionally narrower in interests than the person of advanced professional training. Cowdery concludes from these results that interests "are not dependent upon the amount of training in the profession" and that "the basis for the type of interest response is laid down in the make-up of the individuals by their experiences previous to reaching the university professional training." (*1*)

Strong (*25*) has classified 575 engineers according to their membership status as "full" or "associate" in engineering societies and made a third group of "outstanding men" in their profession, who were selected by Dean T. J. Hoover of the Engineering College, Stanford University. This is a classification which is based partially upon training. A comparison of the interest scores of the three groups should suggest whether there is an advance in professional interest corresponding with advanced levels of training.

The average interest score in engineering of "outstanding engineers," "full members" and "associate members" of engineering societies is shown in Table LXI for the various branches of engineering. On the average, the "outstanding men" secure the highest professional interest scores and the "associate members" the lowest.

TABLE LXI. INTEREST SCORES OF VARIOUS PROFESSIONAL LEVELS OF ENGINEERING PROFESSIONS (STRONG)

		Interest Scores in Own Profession		
Engineering Professions	*Number*	*Outstanding Men*	*Full Members*	*Associate Members*
Number	575	95	344	137
Civil Engineers	153	75	82	63
Electrical Engineers	151	84	72	74
Mechanical Engineers	126	84	75	70
Mining Engineers	145	81	76	59
Average Scores	...	81	76	67

The investigations into training as a cause of interests are unsatisfactory. Neither of the two studies bearing upon the problem follows one group throughout its development. If it

were found that individuals developed more and more interests in their profession as they advanced in training, and increased accordingly their professional score in the inventory, these facts would argue for the influence of training upon interests. Strong's figures suggest this condition, although the three professional levels are represented by three different groups.

On the other hand, if a group that is advancing in professional training shows lower and lower scores, as is suggested by Cowdery's study, this evidence does not necessarily indicate that training is not causing interests. Other interests are perhaps being developed by training different from this professional training, such as social and avocational. Also, the professional interests may be losing their domination of the total interest picture, yet be as great as they were at an earlier period of development. Training would be a causative factor in developing interests, both away as well as toward a professional field. The influence of training upon interests is yet to be determined.

ALLIED PROBLEMS. Breadth or a large number of specific interests has been interpreted by some writers as an indication of superior general abilities or intelligence. When an individual is interested in a wide variety of things and his interests are more or less intense, it has been inferred that such a man is of high intellectual capacity.

There are a few quantitative studies on this question. Three groups of college students (*7*) were studied for evidence upon this problem. Correlation coefficients for these college groups between intelligence scores and numbers of estimated vocational interests, which were expressed in the case histories throughout the periods of childhood and adolescence, do not indicate that number of interests is correlated with ability (Table LXII).

TABLE LXII. RELATION BETWEEN INTELLIGENCE SCORES AND NUMBERS OF VOCATIONAL INTERESTS (FRYER)

Groups	*Number*	*Correlation Coefficient*
Eastern College (Girls)	65	—.20 ± .077
Western College (Mixed)	60	.33 ± .073
Advanced Vocational School (Girls)	15	—.28 ± .137

Jacobsen (*13*) has also investigated this problem by means of the interest inventory. She divided college students into superior and inferior groups, using psychological examination scores and academic grades, and compared the numbers of their interests. In a preliminary experiment with 70 college women, who were superior in intelligence and scholarship, and 64 college women, who were inferior in intelligence and scholarship, it was found that the superior had much the larger number of likes, while the inferior group was characterized chiefly by indifferences, as shown by the following figures:

	Likes	*Indifferences*
Superior Group	40	6
Inferior Group	9	32

There are two mental factors, intelligence and scholarship, which are involved in this relationship found between the number of interests or likes and intellectual superiority. In a further analysis, Jacobsen (*13*) has separated the scholarship influence and controlled the intelligence influence. The new groups, which were selected, were both superior in intelligence. They were composed of 429 men and women who were superior in scholarship and 459 men and women who were inferior in scholarship. The results showed that the superior scholarship group had a great many more likes than the inferior scholarship group. The superior group liked six times as many occupations as the inferior group. The inferior group disliked more items than the superior group (six times as many miscellaneous items). The inferior group is indifferent to more occupations but the superior group is indifferent to more of the general items of the inventory. Table LXIII shows the situation.

TABLE LXIII. DISTRIBUTION OF INTEREST ITEMS IN INVENTORY SHOWING NUMBERS FOR SUPERIOR AND INFERIOR EDUCATIONAL GROUPS (JACOBSEN)

	Liked		*Disliked*		*Indifferent*		*Unknown*	
	by Sup.	*by Inf.*	*by Sup.*	*by Inf.*	*by Sup.*	*by Inf.*	*by Sup.*	*by Inf.*
Occupational Items	57	9	25	28	5	12	0	14
General Items	30	28	7	40	29	3	2	1
Total	87	37	32	68	34	15	2	15

Also, the inferior group is ignorant of more items, particularly of occupational items, than is the superior group. These are group comparisons, of course, where both groups are superior in intelligence but one inferior and one superior in scholarship.

The suggestion from Jacobsen's analysis is that superiority in intelligence is not a factor influencing number of interests, unless it is first an influence upon scholastic training, which in turn causes superiority there. This argues for an indirect influence of abilities or inheritance upon interests, through training. But this influence would not define the specific vocational interest. Experience would do that.

DOES PERMANENCE OF INTERESTS INDICATE SUPERIOR ABILITIES? Another allied problem relates to whether or not permanence of interests goes with superior abilities. Florence Jackson (*14*) has compared the intelligence and academic achievement of college students at Wellesley with the permanence of their vocational interests. She used two groups: one of 105 subjects with interests expressed the same on two occasions (one year apart) and another of 103 subjects with interests expressed the same on three occasions (with year intervals). The measures of abilities are: (a) honors, (b) probations, (c) intelligence scores. The percentages for the two groups are shown in Table LXIV.

TABLE LXIV. PERMANENCE OF INTERESTS IN RELATION TO MEASURED ABILITIES (JACKSON)

	Honor Students	*Probation Students*	*Lower Half of Intelligence Scale*	*Upper Half of Intelligence Scale*
2 Period Permanence ..	17.1%	36.3%	40.9%	59.1%
3 Period Permanence ..	17.5%	39.8%	39.8%	60.2%

From the results of Jackson's study it does not appear that greater permanence of occupational interests is related to intelligence. A genetic case study of interests throughout adolescence by Mackaye (*19*) suggests that early fixation and permanence of interests go with low grades of intelligence and that the interests of persons with superior intelligence do not become fixed until later adolescence.

PREDICTING SUCCESS WITH THE INTEREST INVENTORY. Very little distinction between abilities and achievement or success, was made by the early personnel workers who wished to use the interest estimate for prediction. With the development of the problem and with the use of specialized measures of abilities it became evident that there might be an important relation between interests and success or achievement, while, on the other hand, the relation between interests and abilities might be negligible for purposes of prediction. This conception has developed along with the one that interests are distinct qualities in personality, like abilities, and that both might be independently related to achievement which is the final product of the expression of a personality upon its environment.

The introduction of the interest inventory and the scoring of it for various group interests has made it possible to test out in a practical way the conception of interests as forecasting achievement. The interest inventory can be scored for success in selling, for success in college, for success in any form of achievement, and if the interests are the same for the successful in several groups, then success and definite interests go together—they are related. To be more specific, if a scoring key is devised which is based upon two contrasted groups of retail salesgirls, one successful and the other unsuccessful, and if this scoring key is found to pick the successful salesgirls from other groups of salesgirls we would say that there is a relation between interests and success in retail selling, and further, that we could predict success in retail selling by the individual's interests. If it is true that interests are related to success, the interests of successful groups would be different from the interests of unsuccessful groups, and it would be possible to pick the successful by their interests, to the degree of the relation existing between interests and success.

THE INTERESTS OF SUCCESSFUL AND UNSUCCESSFUL SALESMEN. Merrill J. Ream (*23*) was the first to attack the problem of the relation of interests and success in selling. Using the Carnegie Interest Inventory (1921 edition) he administered it to a primary group of 12 unsuccessful salesmen and 27 successful salesmen, and to a control group of 19 un-

successful salesmen and 42 successful salesmen. His criterion of success in selecting these groups was the records of practice selling of the individuals while they were student insurance salesmen. A scoring key[7] was devised upon the primary groups by Ream's method, which was developed in this study. The scoring key was composed of 13 occupational items and 9 general items which indicated the successful salesmen. These items were scored +1. There were 14 occupational items and 7 general items which indicated the unsuccessful salesmen. These were scored —1. The Carnegie Interest Inventory was composed of 72 occupational and 126 general items; thus the number of significant items is seen to be very small.

The individual inventories of the primary group, upon which the scoring key was devised, show the following median scores for the successful and unsuccessful salesmen:

Successful salesmen, 17.2 Unsuccessful salesmen, 0.5

The difference between these median scores is many times the standard error of the difference (1.22). These figures suggest that the interest inventory may be an excellent differentiating measure between successful and unsuccessful salesmen.

If the scoring key includes truly discriminating interests of successful and unsuccessful salesmen it should distinguish between the successful and unsuccessful salesmen of the control group. To test the validity of the scoring key, the individual inventories of the control group were scored with Ream's Scoring Key of Successful Salesmen. The median

[7] Ream's Scoring Key of Successful Salesmen was composed of the following items:

Occupational items denoting success (and scored +1) were *to like* actor, editor, hotel manager, judge, magazine writer, mechanical engineer, novelist, office manager, preacher, social worker (10), and *to dislike* auto repairman, rancher, and secret service man (3). General items denoting success (and scored +1) were *to like* interviews, opening conversation with stranger, working alone, arguments, teaching, living in the city, economics (7) and *to dislike* working with things, mathematics (2).

Occupational items denoting failure (and scored —1) were *to like* astronomer, automobile salesman, bank teller, carpenter, dentist, draftsman, forest ranger, locomotive engineer, machinist, poet, retail merchants (11), and *to dislike* consul, hotel manager, novelist (3). General items denoting failure (and scored —1) were *to like* absent-minded people, working with things (2), and *to dislike* very polite people, working alone, arguments, public speaking, sociology (5).

scores of the successful and unsuccessful salesmen are as follows:

Successful salesmen, 5.5 Unsuccessful salesmen, 4.5

The standard error of the difference here is .88, or about equal to the difference. There is no differentiation of successful and unsuccessful salesmen in the control group.

Craig (*2*) made a similar attempt to differentiate between successful and unsuccessful saleswomen with the interest inventory. A primary group of twenty-five "good" and twenty-five "poor" saleswomen was selected from the records in the Kaufmann Department Stores, Inc., in Pittsburgh. Four of the experimental interest questionnaires developed in Yoakum's seminar at the Carnegie Institute of Technology were administered by Craig to this group. One of these, "The Record of Preferences," which was scored by a scoring key devised after Ream's method, was found to distinguish to a significant degree between the "poor" and the "good" saleswomen. Eighty-eight per cent of the "poor" saleswomen were divided from ninety-two per cent of the "good" saleswomen. Eighty-nine per cent of the whole were correctly placed. This is a discrimination of sales achievement from lack of sales achievement to a significant degree. These percentages were secured from the primary group upon which the scoring key was devised.

A control experiment was undertaken upon saleswomen in the R. H. Macy Company, New York, to validate the scoring key. From sixty-five selected saleswomen groups of twenty-five "good" and thirteen "poor" were made up from the sales records. The "Record of Preferences" was administered to this group. Craig's Scoring Key for Successful Salesclerks, which was made of the interests of the Kaufmann group, would not distinguish the "good" saleswomen and the "poor" saleswomen of the Macy group. A new scoring key was devised after Ream's method upon the Macy group with the result that it distinguished between the "good" and "poor" saleswomen of this group to a marked degree, and a correlation coefficient of .76 between scores and sales records of the group of sixty-five was found. The scoring key devised

upon the Macy group was then turned upon the Kaufmann group with the result that it refused to distinguish between "good" and "poor" saleswomen in this group. To test the matter out further, a second control group of seventy-one saleswomen was selected at the Macy Department Store. The scoring key devised upon the first Macy group was used in scoring the inventories of this group with the result that the low correlation of .034 was found between the inventory scores and sales records. Thus any scoring key not devised upon the group being inventoried failed to distinguish between the successful and unsuccessful sales people.

Freyd (5) used the Carnegie Interest Inventory (1921 edition) to distinguish between successful and unsuccessful salesmen. His groups were composed of sixteen stock salesmen in New York and fifteen stock salesmen in Philadelphia, representing three well-defined levels of sales ability: successful, average, and failures. Similar results to those above were found.

The facts show a failure to select successful salesmen from unsuccessful salesmen by their interests. Scoring keys of distinguishing interests between the successful and the unsuccessful have been made, which separate to a high degree the successful from the unsuccessful of the primary group. When applied to other groups, however, the scoring key always failed to distinguish the successful from the unsuccessful. Evidently the scoring keys included interests that by chance distinguish the successful from the unsuccessful of the primary group. Any social group seems to develop some distinctive interests. These interests included in the scoring keys were not interests to be relied upon as distinguishing between successful and unsuccessful salesmen in general. It is suggested by the research upon this problem that there are no group interests common to all successful salesmen, and likewise none common to all unsuccessful salesmen.

CONCLUDING STATEMENT. The relation of interests to vocational achievement, or success, is, as yet, undetermined. There has been a trial among salesmen, which has failed, from which fact comes the suggestion that interests are not closely related to vocational success. The situation may be true of

other vocational fields besides that of selling, or it may not.

The theory persists that interests are causative factors in success, over a long period of work, if not for the short period involved in a testing program. It is held to be a sound workable theory. This is in spite of the lack of support by the studies of sales interests. Selling is regarded as qualitatively different from such vocations as medicine, law, accountancy, advertising, and so on. As with these, it is believed that success in selling is partly, if only slightly, determined by interests peculiar to the occupation. The whole technique of measuring interests, as used in the study of the interests of salesmen, may be inadequate to a solution of this problem. In addition, it may be that a different factor from that defined by estimates and inventories as interests, such as motivation, is the factor thought of as important for achievement.

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PREDICTING EDUCATIONAL ABILITIES FROM INTERESTS. The early studies of the relation of educational interests to educational abilities are very unsatisfactory in method of work and conclusions drawn from the results secured. The pioneer in blazing the trail always has a wealth of opportunity to err in method. When the early investigation of a field of mental activity is performed with serious errors determining the results, the problem of later investigators is not only to investigate the factors under consideration, but also to determine the extent to which the erroneous methods used have vitiated results.

EARLY INVESTIGATIONS INTO THE RELATION OF EDUCATIONAL INTERESTS AND ABILITIES. The pioneer investigations of the relation of educational interests and abilities were made by E. L. Thorndike. (*19, 20*) Thorndike asked first 100, and afterwards 344, college students to rank seven general educational subjects in the order of their interest: (1) as these subjects interested them in the elementary school; (2) as the subjects interested them in the high school; and, (3) as they interested them in college. The students were also asked at the same time to rank these educational subjects according to their abilities in them. The average (median) correlations between the individual's rank of abilities and his rank of interests in school subjects are reported in Table LXV.

TABLE LXV. RELATION BETWEEN ESTIMATED INTERESTS AND ESTIMATED ABILITIES (THORNDIKE)

Educational Period	*Average (Median) Correlation for 100 Students*	*Correlation for 344 Students*
Elementary School	.89	.89
High School	.89	.89
College	.89	.89

Another early study of the relation of educational interests to educational abilities is that of Bridges and Dollinger (*2*) in which five hundred college students were asked at the beginning of the semester to rank their college courses, first, according to their interests in them; and, second, according to their abilities. At the conclusion of the semester the students' grades in these courses were procured and the following cor-

by the author upon a group of 71 students in the University of Utah. (*6*) The average (median) correlations, by the Spearman Rank Difference Method, between the individual's ranked interests and his ranked abilities are shown in Table LXVI.

TABLE LXVI. THE CORRELATION OF INTERESTS AND ABILITIES FOUND BY THORNDIKE'S METHOD (FRYER)

Educational Periods	*Number*	*I Interests and Estimated Abilities*	*Number*	*II Interests and School Grades*	*III*[1] *Interests and Estimated Abilities*
Elementary School	68	.85 ± .02	24	.63 ± .09	.85 ± .02
High School	68	.86 ± .02	28	.60 ± .08	.89 ± .03
College	45	.89 ± .02	14	.80 ± .07	.82 ± .07

These correlations verify the relationship of .89 established by Thorndike between educational interests and estimates of abilities. For all the cases included in the study (column No. I) there is a correlation of .85 for the elementary-school expressions, of .86 for the high-school expressions, and of .89 for the college expressions. The relationships between educational interests and abilities as indicated by school grades (column No. II), however, are considerably lower. There is a correlation for the grammar-school expressions of .63, for the high-school expressions of .60, and for the college expressions of .80. The number of cases for this sample is smaller, but the reliability of the larger sample is suggested for this smaller group by the fact that the correlations between interests and estimated abilities are similar to the larger group (column No. III compared with column No. I).

The purpose of this trial of Thorndike's method was not mainly to contribute additional data to those already accumulated. It was to study a method which appeared on the face of it to be open to question. This study has brought to light several uncontrolled influences which enter into the results.

There are found here somewhat higher correlations (.60

[1] For same cases as in column II.

for elementary school and high school) between interests and school grades than found by Thorndike in reworking the data of Bridges and Dollinger (.46). Bridges and Dollinger collected their data without requiring the students to classify their interests and abilities into subject groups. In the use of Thorndike's method the individual is limited in his selections of interest expressions to seven educational subjects. These are mathematics, history, literature, science, music, drawing, and other handwork. Accordingly, the student must classify additional educational interests, which he may have, under these seven heads. This difference in method would appear to be an influence causing the higher correlations given above, and this in turn suggests that the Thorndike method predetermines a higher correlation when applied to the collection of any data.

Since the estimations of interests and abilities were called for at the same time, it would seem that one judgment might affect the other. King and Adelstein (*9*) used Thorndike's method in the study of the relations of interests and abilities with this condition changed. The ranking of interests and abilities was done upon two different occasions. Median correlations for 140 University of Iowa students between the individual's ranked educational abilities and his ranked educational interests were reported for three periods, as follows:

Elementary School	.73
High School	.79
College	.73

These coefficients are about .1 lower than those by Thorndike's method, as originally used, and this change in method may have been the cause.

Another unknown influence upon the results lies in the procedure of limiting and determining the school subjects to be ranked by the student. In other investigations this has tended to increase the correlation. Here, too, it may have done so. Still another unknown influence is added, namely, the fact that the seven groups of subjects used by Thorndike, while representative of the elementary-school curriculum, are not as representative of high-school and college curricula. All

of this raises the question of the validity of Thorndike's method on which rests the theory that educational interests are highly predictive of educational abilities.

FURTHER INVESTIGATION OF THE PROBLEM. This problem has been made the subject of further study by the author, in which the attempt has been made to control the factors influencing the measures of relationships criticized above. In an investigation of 104 University of Utah students in 1923-24 (*6*) no limitation, other than of number of choices, was placed upon the formation of the list of educational interests or estimated educational abilities. Assignments requesting elementary-school expressions, high-school expressions, and college expressions were made at intervals of three days. At a later date, school grades were requested for elementary school, high school, and college. The average (median) correlations, by the Spearman Rank Difference Method, between the individual's ranked interests and abilities are shown in Table LXVII.

TABLE LXVII. CORRELATIONS BETWEEN INTERESTS AND ABILITIES (FRYER)

Educational Periods	*Number*	*I Interests and Estimated Abilities (all cases)*	*Number*	*II Interests and School Grades*	*III*[2] *Interests and Estimated Abilities*
Elementary School	104	.57 ± .04	47	.10 ± .09	.57 ± .06
High School	104	.70 ± .03	50	.33 ± .09	.70 ± .05
College	43	.60 ± .07	30	.28 ± .11	.65 ± .06

While elementary school, high school, and college periods were separated in the requests for information in this investigation, the requests for interest expressions and estimated abilities were made at the same time. All assignments have been separated, and requested at intervals of several days, in a supplementary investigation involving 89 students in New York University. (*6*) In gathering the data from these students other possible causes of errors were avoided. These

[2] For same cases as in column II.

changes in method seem not to have materially affected the results, however. School grades were secured only for the high school period for these subjects. The average (median) correlations, by the Spearman Rank Difference Method, between the individual's ranked interests and his ranked abilities are shown in Table LXVIII.

TABLE LXVIII. CORRELATIONS BETWEEN INTERESTS AND ABILITIES (FRYER)

	Number	*Interests and Estimated Abilities*	*Number*	*Interests and School Grades*
Elementary School ...	89	.60 ± .05	—	
High School	81	.66 ± .04	44	.39 ± .06
College	86	.61 ± .05	—	

The results from the two samples, one in a western college and the other in an eastern college, verify each other almost exactly. For the elementary school estimates of interests and abilities the correlations are .57 and .61; for the high school estimates, .70 and .66; for the college estimates, .60 and .60. Between interests and abilities, as indicated by school grades, the correlations for high school are .33 and .39. Correlations between .60 and .70 would seem to represent the relationship between interests and estimated abilities and correlations between .30 and .40 would seem to represent the relationship between interests and abilities, as indicated by school grades.

OTHER INVESTIGATIONS INTO THE RELATION OF INTERESTS AND EDUCATIONAL ABILITIES. A different approach to this problem is made by Columba (*3*) who compared the educational achievement of elementary school students who prefer a certain school subject to that of the remainder of the class. The measure of comparison was the average achievement quotient (Stanford Achievement Test) of the two groups. The comparison was made for six school subjects: arithmetic, reading, spelling, geography, history, language, among 356 pupils in the fifth, sixth, seventh, and eighth grades. Of the 24 comparisons by subjects there are seven in which the group preferring the subject is five points, or more, higher in achievement than the remainder of the class and three in which the

remainder of the class is five points, or more, higher than the group preferring the subject. In the other 14 comparisons the two groups are within five points of each other. The figures (Table LXIX) show the situation where the interested and non-interested groups for the various school subjects are combined and compared for school grades.

TABLE LXIX. COMPARISON OF AVERAGE EDUCATIONAL ACHIEVEMENT OF PUPILS PREFERRING CERTAIN SCHOOL SUBJECTS AND PUPILS NOT PREFERRING THOSE SUBJECTS (COLUMBA)

	Average Achievement Quotients	
Grades	*Group Preferring Subject*	*Remainder of Class*
V	111.8	112.4
VI	104.4	100.8
VII	101.0	101.2
VIII	101.1	96.7
All grades	104.2	102.8

The differences in achievement between those who prefer subjects and those who do not are insignificant when the groups are large enough for reliable comparison. While no probable errors of these averages are given, this conclusion is evident from the close agreement of the figures. However, there is a slight tendency, as shown in the average for all grades, for those who prefer certain subjects to rate higher in achievement. Here the two groups include enough subjects to be significant.

Langlie (*11*) has made a similar study with different results, in which he computed the ratio making "best grades" of college students interested in educational subjects and college students generally. This study included 172 freshmen in 1927-28 at Wesleyan University, from whom educational interest estimates of two high school subjects were secured upon entrance and classified into English, mathematics, ancient language, modern language, social sciences, and natural sciences. Sixty-nine per cent (median for all educational subjects) more students who were interested in the subjects made "best grades" than did the group as a whole. Twenty-nine per cent (median for all subjects) fewer students who were

interested in the subjects made "worst grades" than did the group as a whole. Estimates of one or more college educational interests were also secured from this group upon entrance. A similar record of fifty-nine per cent (median for all educational subjects) more students who were interested in the subjects made "best grades" than did the group as a whole, while twenty-four per cent less made "worst grades." A similar situation was found when the study was of subjects disliked. There are, according to this investigation, exceptional chances that students interested in educational subjects will make "best grades" in those subjects.

Terman (*18,* 368) has made a group comparison between ranked educational interests, assembled from those made by the children, and ranked educational abilities, assembled from those made by the teachers. His groups were composed of 527 normal children and 643 gifted children (with I.Q.s of 140 or above). The correlations (rho) between educational interests and abilities are as follows: gifted boys, .44; gifted girls, .18; normal boys, .48; normal girls, .55; and an average for all groups of .41. These correlations are somewhat lower than those reported earlier between educational interests and estimated abilities.

THE RELATION OF EDUCATIONAL INTERESTS AND ABILITIES (SUMMARY). There are three different measures of educational achievement which have been used in the comparison with estimated interests: (1) the individual's own estimates of educational abilities; (2) the estimates by others; (3) school grades. The results by the several measures of abilities must of necessity be treated separately.

1. The relation between educational interests and estimated abilities (by the individual himself) is represented by a correlation coefficient not higher than .70, which is the correlation found by Thorndike in evaluating the data of Bridges and Dollinger. Correlations range from .57 to .70 for this measure, with the average (mean) at .63. The probability, judging from the data available, is that the relation between estimated educational interests and educational abilities estimated by the individual is about .60. The higher correlation

found by Thorndike of .89 for this relationship must be disregarded in the light of more refined methods.

2. The relation between educational interests, estimated by children, and educational abilities, estimated by teachers from work done, has been placed by Terman at about .40.

3. The relation between estimated educational interests and educational abilities, as represented by school grades, is lower. The average correlation found by Thorndike in reworking the data of Bridges and Dollinger was .46. In the writer's investigations the correlations run from .10 to .39. For the five correlations available for this measure, ranging from .10 to .46, the average (mean) is .31. A correlation of about .30 would appear to represent the average relation between educational interests and educational abilities according to school grades.

Which of these measures is the best indication of the relation between estimated interests and educational abilities or achievement? The answer rests upon which is the best indication of the individual's educational abilities: his own estimates, teachers' estimates, school grades. Thorndike has argued (*21*) that the relation between interests and self-estimated abilities is nearer the truth than the relation between interests and school grades. This may be true in certain instances but it would not seem to be so generally. School grades have wide acceptance as the best criterion of educational abilities. They are partially objective and objective measures are more accurate as a rule. Opinion would favor the relation existing between interests and school grades as the best representation of the true situation. If the correlations, secured with the various criteria of educational abilities, are averaged (.63, .40, .31) the correlation is .43 (mean).

The correlations between estimated *vocational* interests and abilities are slightly lower than this, but not significantly so. The correlations between vocational interests and abilities run from about .10 to .60, which is almost exactly the relationship found between educational interests and abilities according to school grades. It would be expected that the relations for educational interests and vocational interests with abilities would be the same. Such differences as are found are ex-

plained by the differences in method of evaluating the data, by differences inherent in the data itself, as the list of educational subjects is more limited than the list of occupations, and by the differences in criteria of abilities. The fact that the results for educational interests and vocational interests are closely similar is a further verification of the relationship established in both fields of mental activity.

THE PREDICTIVE VALUE OF ESTIMATED INTERESTS FOR EDUCATIONAL GUIDANCE AND SELECTION. The facts are quite clear. Estimated educational interests, the interest expressions of the individual, are not indicative of educational abilities to a high degree. Rather may it be said that they are suggestive of abilities. Educational guidance and selection must take this situation into consideration. College selection has already done so. Not every student who wants to enter college has this privilege. There is a selection system in most colleges making use of educational ability measures, and in some colleges other personality factors, along with interests, are used in predicting a successful college training for the boy or girl.

It is probable, as with estimated vocational interests, that the predictive value of educational interests is different at different ages, both for chronological and mental ages. This has not been determined. It is possible that there is a tendency for educational interests to come closer to abilities, or to become more practical, as the child grows older. There is, however, less opportunity for the child to be as extravagant in his specific educational interests as in his specific vocational interests.

The correlations indicating the relation between estimated interests and educational abilities suggest that in general there is a lack of understanding on the part of the individual of the best fields of ability expression. These relationships indicate that a student's statement of educational interests is not predictive of corresponding abilities. Contrary to an earlier accepted theory in educational guidance, educational interests are found to be only of suggestive value. On careful thought, everyday observation lends support to these conclusions. Interests and educational abilities have a relationship that is

positive, but this relationship is so low that it is only suggestive for the prediction of educational abilities from estimated educational interests.

PLAY INTERESTS AND ABILITIES. Plays and games in their spontaneous forms of expression are considered by many to be the best single indication of the development of children. Terman (*18*, 385-439) and his co-workers have compared the play interests of 554 gifted children and 474 normal children by means of a play interest inventory. This study suggests the relation of play interests to abilities. Correlation coefficients between the play interest scores of gifted groups and normal groups are shown in Table LXX.

TABLE LXX. COMPARISON OF PLAY INTERESTS (TERMAN)

Groups	*Correlation Coefficient*
Gifted Boys and Normal Boys	.83 ± .022
Gifted Boys and Gifted Girls	.20 ± .068
Gifted Boys and Normal Girls	.18 ± .069
Normal Boys and Normal Girls	.35 ± .062
Normal Boys and Gifted Girls	.22 ± .068
Gifted Girls and Normal Girls	.82 ± .022

The play interests of children seem to be determined more by sex, as these figures indicate, than by intelligence. The correlation between opposite sex groups is always low, even in the same intelligence group. Between the same sex groups it is high, even if the intelligence group is different. There is little support here for a theory that play interests and intelligence are closely related in children.

INVENTORIED INTERESTS AND EDUCATIONAL ABILITIES. The interest inventory was applied to the measurement of interests for the prediction of educational abilities and vocational abilities at about the same time. Kornhauser (*10*) made a limited investigation into the possibility of distinguishing between successful and unsuccessful college students as early as 1923, following the similar project by Ream to distinguish between the successful and unsuccessful salesman. The findings of both of these pioneer investigators were discouraging in the attempt to select abilities from interests. Kornhauser

developed scoring keys for general educational abilities. He administered his General Interest Inventory to 110 freshmen in the University of Chicago. His criterion of educational success was the college grade. The one hundred and ten students were sorted into three groups: the twenty-five per cent with the highest grades, the twenty-five per cent with the lowest grades, and the fifty per cent intermediate. From each of these groups was selected a sample of fifteen student inventories upon which the scoring key was devised by Kornhauser's modification of Ream's method. Thirty items were found to be differentiating items, which distinguished the high, or successful students, from the low, or unsuccessful students. Each item was scored "1."

The individual inventories of the group of one hundred and ten students, including the forty-five on whom the scoring key was devised, showed a range of scores from 7 to 26 with a correlation between this distribution and the distribution of college grades of .52. This was an encouraging correlation for a pioneer attempt. But the correlation for the forty-five students, upon whom the scoring key was devised, was found to be .73, and the corresponding correlation for the remaining sixty-three students of the group, upon whom the scoring key was not devised, was only .17. Also, it was found that only eight of the thirty differentiating items in the scoring key remained satisfactory items when used to distinguish between the interests of a sample of ten high, ten intermediate, and ten low students who were selected from this latter group of sixty-three. In addition, using the scoring key of thirty differentiating items upon a new group of sixty-eight inventories, a correlation between the distribution of scores and the distribution of college grades was found to be only .16. These are correlations which suggest little relationship between interests and educational abilities.

In addition, Kornhauser (*10*) investigated the prediction of academic success by extreme interest scores. There was a five-degree classification for the rating of each item in the inventory, as follows:

Actors: L!, L, I, D, D!

Taking the number of extreme likes and the number of extreme dislikes as his measure of interests, Kornhauser correlated these scores for 108 college students with academic grades. A negative coefficient of —.22 was found. Another group gave a corresponding plus correlation. The conclusion here is that extreme feeling, as indicated in this inventory, is not correlated with success.

Application of the Interest Inventory to College Personnel Procedure. Experimentation has been carried on at several universities based upon the theory of Kornhauser's work that interests might be related to general educational abilities and achievement to an extent that they can be used to predict educational achievement. Intelligence tests have been used quite generally to predict college achievement. The prediction from these measures is only fair. It was thought by various investigators that the inventory when scored for the interests of educational ability groups might increase the chances of predicting the successful college student. The relationship found between estimated interests and abilities is high enough to suggest this possibility.

Shuttleworth (*15, 16, 17*) developed the University of Iowa Assayer for this purpose. In a preliminary experiment in 1924, Shuttleworth found that forty items of the "Personnel Assayer," used by Hornell Hart, discriminated between superior and inferior freshmen at the University of Iowa. A revision of this inventory was made to include these forty items with others which were thought might have discriminating value, and the Iowa Assayer, totaling 105 items, was administered to the freshman class at the University of Iowa in 1924. Individual correlations between interests and freshman grades ranged from .25 to .49. This preliminary experiment suggested the possibility of predicting academic success from the interest inventory when scored for educational abilities.

Shuttleworth (*16*) used a primary group of 269 women and 374 men, all freshmen in the University of Iowa in 1926, as his sample upon which to develop a scoring key of intelligence and a scoring key of scholarship. To this group was administered the second edition of the Iowa Assayer, composed

of 200 general interest items. For the comparison of items in the inventory, Shuttleworth divided his sample as follows:

40 men and 33 women of superior intelligence
294 men and 203 women of average intelligence
40 men and 33 women of inferior intelligence

40 men and 33 women of superior scholarship
294 men and 203 women of average scholarship
40 men and 33 women of inferior scholarship

Ninety-four items were found to differentiate between the superior and the inferior groups, 34 items for intelligence and 60 items for scholarship. These items formed the intelligence scoring key and the scholarship scoring key.

One hundred and twenty of the primary group were scored for both scholarship interests and intelligence interests. These scores are compared with freshmen grades and intelligence test scores in Table LXXI.

TABLE LXXI. CORRELATIONS BETWEEN INTERESTS AND INTELLIGENCE AND INTERESTS AND SCHOLARSHIP (SHUTTLEWORTH)

Interests (Scholarship Scoring Key) vs. Scholarship	$.50 \pm .05$
Interests (Intelligence Scoring Key) vs. Scholarship	$.18 \pm .06$
Interests (Intelligence Scoring Key) vs. Intelligence	$.40 \pm .05$
Interests (Scholarship Scoring Key) vs. Intelligence	$.49 \pm .05$
Interests (Intelligence and Scholarship Scoring Keys Combined) vs. Scholarship	$.42 \pm .05$
Interests (Intelligence and Scholarship Scoring Keys Combined) vs. Intelligence	$.54 \pm .04$
Interests (Scholarship Scoring Key) vs. Scholarship (with Intelligence Partialed Out) [8]	.29

Many of these correlations indicate a fair prediction for the scoring keys. But they are correlations in comparisons using the primary group upon which the scoring key was devised. The influence of this factor has already been indicated by Kornhauser (*10*) and by numerous studies in other fields of interests. It is important to know what these correlations

[8] This is termed a partial correlation. "A coefficient of partial correlation may be said to represent the net relation between the two variables when one or more other variables which might increase or decrease the true correlation have been ruled out or held constant." (Garrett, H. E.: *Statistics in Psychology and Education*, New York: Longmans, Green, 1926, p. 222.)

would be for a control group, and such a validation is necessary before any judgment can be made of their predictive value.

The Iowa Assayer, in revised form with 120 items, was administered by Shuttleworth (*17*) to all 1926 freshmen, and new scoring keys devised for men and for women. Correlations with first semester academic grades are reported similar to those given above, of .43 ± .05 for 123 men and of .46 ± .06 for 69 women. With the College Entrance Examination, composed of reading, comprehension, English aptitude, English training and high school content, the correlation was .61 ± .04 for both groups. Shuttleworth's conclusion, in regard to selection for college, was that his scoring keys measured very much what was better measured by the College Entrance Examination.

A Qualitative Analysis of Interests. Shuttleworth (*17*) has made an analysis of the relationship of various kinds of interests, and their value in predicting academic achievement. He separates out of the scoring key items of different quality:

Intellectual and cultural interests
Spiritual and ethical religious interests
Freedom from conventional interests
Political liberalism interests
Freedom from pleasure-seeking interests
Non-mechanical interests

The thirty intercorrelations between the scores for these interests, for 123 men and 69 women, range from .04 to .53 with an average (mean) of .23 (median, .21), which suggests a low relationship between these various groupings of interests, and might imply their psychological independence. But more likely the low intercorrelations are due to the low reliability of the scoring, as less than 20 items were included in each scoring key. Correlations for these qualitative groupings with academic grades show only two which are above .10 for the men (.22 for intellectual and cultural interests and .30 for freedom from conventional restraint). In these two groupings of interests the scores correlate .50 and .43 respectively with the scores in the entrance examination. For the women, intellectual and cultural interests correlate .25

with academic grades, spiritual and ethical religious interests correlate .30, freedom from conventional interests .19, political liberalism interests .35, and the remaining two below .10. For the four named groupings, the correlations for women with entrance examinations are .40, .39, .16 and .25 respectively.

THE MINNESOTA EXPERIMENT. An extensive trial of the interest inventory as a part of college personnel procedure is being carried out by Paterson and his co-workers at the University of Minnesota. This experiment dates back to 1923 when Paterson revised the Carnegie Interest Inventory (1921 edition) for use with college students and applied it to the examination of freshmen admitted to that institution, in connection with the Minnesota College Ability Test. Most of this work is reported in an unpublished doctor's dissertation by Jacobsen (7) on file in the University of Minnesota Library.

The purpose of this research was to test out the possibilities of scoring the interest inventory for the prediction of educational abilities or scholarship. Three sets of scoring keys have been developed to include the differentiating interests of educational ability groups. The criteria for the development of these scoring keys were scores in the College Ability Test and scholastic grades received during the freshman year. The former is referred to as a measure of general intelligence and the latter as a measure of educational abilities.

In a preliminary experiment a scoring key of 157 items was devised by Ream's method and based upon the differentiating interests of 70 women students superior in scholarship and intelligence and 64 women students inferior in scholarship and intelligence. The distributions of the scores of these two groups, when scored with this first Minnesota scoring key of educational abilities, showed differences between the averages of 16.74 times the standard deviation of this difference. But when the scoring key was applied to a control group of 27 students superior in scholarship but inferior in intelligence and a group of 31 students inferior in scholarship and superior in intelligence, the difference between the averages of the two groups was only 4.18 times the standard

deviation of the difference. A validation of the scoring key upon a control group of 200 freshman women, which included half of the primary group upon which the scoring key was devised, showed interests to be correlated with intelligence .55 and with educational abilities .48. When interests and intelligence combined were correlated, by the multiple correlation technique,[4] with educational abilities, a correlation of .58 is reported as compared with one of .54 between intelligence and educational abilities. A further validation of the scoring key upon 232 women students, none of whom were included in the primary group, showed correlations of .40 between interests and intelligence, and .22 between interests and educational abilities, while a multiple correlation is reported of .51 between combined interests and intelligence and educational abilities as compared with .50 between intelligence alone and educational abilities.

This research did not lead to encouraging conclusions for the selection of college students of superior academic qualifications by means of their interests. The scoring key seemed to group students according to high and low intelligence, as measured by the College Ability Test, although this test must be considered a measure of academic abilities to a fair degree. But more evidence seems to come from this research, than had hitherto been gathered, that interest differences between ability groups are sufficiently constant to use interests to differentiate between these groups.

Paterson and his co-workers decided to hold what was measured by the College Ability Test constant in the comparisons and build scoring keys upon purely scholastic differences. They were seeking to measure something different to what was measured by the College Ability Test for the prediction of scholastic success. A second and more extensive experiment was planned. (7) To build a second scoring key of educational abilities, 133 women students, who were superior in scholarship and in intelligence, were contrasted

[4] "The multiple coefficient of correlation may be thought of . . . as giving the correlation between a trait (or traits) as measured by a single test, and the same trait (or traits) as measured by a number of tests taken together." (Garrett, H. E.: *Statistics in Psychology and Education,* New York: Longmans Green, 1926, p. 222.)

with 94 women students, who were inferior in scholarship but superior in intelligence. This scoring key included 66 differentiating interests. These groups were now selected from two freshman classes, in order to represent as many interests of these educational ability groups as possible. When scored with the second scoring key this primary group showed a difference between the averages (means) of the superior and inferior of 12.8 times the standard deviation of the difference, and when comparisons were made for a control group of 425 freshman women (which included half of the primary group) a correlation of .26 was found between interests and intelligence and of .44 between interests and educational abilities. A multiple correlation of .60 comparing intelligence and interests with educational abilities is reported, while one of .52 is reported between intelligence and educational abilities. A second validation of this scoring key with a new group of 304 freshman women gave a correlation of .19 between interests and intelligence and of .32 between interests and educational abilities. Here the correlations are lower as would be expected when the influence of the primary group is removed. This second scoring key was tried out upon 250 first-year men. Similar correlations are reported of .21 between interests and intelligence, and .29 between interests and educational abilities. The correlations of .32 and .29 between interests and educational abilities lead to the conclusion that interests are only slightly predictive of educational abilities or achievement. But it should be recalled that these correlations are almost as high as those often found between general intelligence tests and college scholarship grades.

A more extensive experiment was now planned to establish scoring keys which would distinguish between educational ability groups by their interests. (7) There were to be separate scoring keys for men and women, and also a combined scoring key. The primary group was selected from men and women who were freshmen in 1923, 1924, and 1925, in order to include as wide a representation of these group interests as possible. The primary group upon which the scoring keys were to be devised was composed of the following:

196 men and 233 women superior in educational abilities (and superior in intelligence)
313 men and 139 women inferior in educational abilities (and superior in intelligence)

Intelligence was held constant. Ream's method was used in devising this third Minnesota Scoring Key of Educational Abilities, which, it would seem, should thoroughly test out the assumption that educational abilities (achievement or scholarship) are sufficiently dependent upon interests that grades in these abilities might be predicted upon knowing the individual's interests. There were included 105 items in the men's key, 88 items in the women's key, and 96 items in the common key.[5] The men's scoring key showed a difference between the averages (means) of the superior and inferior groups of 12.11 times the probable error of the difference, and the women's scoring key, of 11.92 times the probable error of the difference. This is a reduction in the significance of group differences found in the first two scoring keys, which is probably due to the use of larger primary groups.

It was found in forming the third scoring key that few items showed a difference of 3 times the probable error of the difference between the superior and inferior groups, so the criterion for the inclusion of distinguishing items was changed to include all those items that showed a difference in the same direction for the three classes. This fact coupled with the one just mentioned would seem to indicate that in the use of a large primary group selected from several freshman classes a great many changing interests of these ability groups will be encountered. It is probable that this fluctuation of interests of ability groups is greater than that of occupational groups.

A validation of the third Minnesota Scoring Key of Educational Abilities was made upon a control group of 300 men and 300 women who were freshmen in 1926. The correlations reported between interests and the factors of intelligence and educational abilities are shown in Table LXXII.

Correlations of .30 to .44 are reported between interests and educational abilities and a slight increase in the prediction of

[5] See Appendix IV for Minnesota Scoring Keys of Educational Abilities.

educational abilities is shown when the interest inventory is added to the College Ability Test. Also, students of both superior and inferior intelligence were found to be divided into superior and inferior scholarship groups to an extent indicated by a standard deviation of the difference of 16.5 times the difference between the averages (means) of the two groups.

TABLE LXXII. CORRELATIONS BETWEEN INTERESTS AND INTELLIGENCE AND EDUCATIONAL ABILITIES FOR 300 FRESHMAN MEN AND 300 FRESHMAN WOMEN (JACOBSEN).

	Men		*Women*	
	(*Men's Key*)	(*Common Key*)	(*Women's Key*)	(*Common Key*)
Interests *vs.* Intelligence....	.21	.33	.40	.33
Interests *vs.* Intelligence (Educational Abilities Constant).....	.08	.19	.22	.16
Interests *vs.* Educational Abilities.....	.30	.35	.44	.39
Interests *vs.* Educational Abilities (Intelligence Constant)	.23	.23	.29	.26
Intelligence *vs.* Educational Abilities.....	.48	.48	.54	.54
Intelligence *vs.* Educational Abilities (Interests Constant).....	.45	.40	.44	.47
Interests and Intelligence *vs.* Educational Abilities.....	.58	.55	.63	.65

Based upon these results the third Minnesota Scoring Key of Educational Abilities (Men and Women) has been used as a part of the personnel procedure in the selection of students at the University of Minnesota. It is concluded that the interest score adds about .1 to the predictive value of educational abilities when the College Ability Test and the interest inventory are used in conjunction. This predictive value is represented by multiple correlations as between .55 and .65. Later use of these scoring keys of the interests of ability groups has indicated that there is continually needed a recalibration of the

scoring keys to include the changing interests of these ability groups.

The reliability of this third Minnesota Scoring Key has been tested by Jacobsen. (7) Odd-even reliability coefficients corrected by the Spearman-Brown formula are given for 250 men and 250 women. These are shown in Table LXXIII.

TABLE LXXIII. RELIABILITY OF THIRD MINNESOTA SCORING KEY OF EDUCATIONAL ABILITIES (JACOBSEN)

	Reliability		*Coefficient Corrected by Spearman-Brown formula*	
	Raw Coefficient			
	Men	*Women*	*Men*	*Women*
Total Interest Score	.71 ± .03	.51 ± .03	.83 ± .02	.68 ± .03
Occupational Interest Score	.56 ± .03	.42 ± .03	.72 ± .03	.59 ± .03
General Interest Score	.62 ± .03	.43 ± .03	.77 ± .03	.66 ± .03

THE INTERESTS OF EDUCATIONAL ABILITY GROUPS. The researches in which the aim has been to score the interest inventory for the interests of educational ability groups have demonstrated that group interests of the scholastically superior and inferior do exist. But these group interests do not seem to be very numerous and constant. They do not seem to be nearly as stable as the group interests of professional and other occupational groups. Scoring keys can be built to include the common interests of ability groups. It was found in the Minnesota Experiment to be possible to validate these ability group interests over a period of a year or two. But the interests that are common in a number of similar groups seem to be few in number. No items could be found in building the third Minnesota Scoring Key that showed differences of three or more times the probable error of the difference for the three college classes used as the primary sample.

The existence of common interests among the same ability groups *over a long period of time* and *over a wide area of environmental stimulation,* which are sufficient to predict educational achievement from interests by the method of the interest scoring key, has yet to be demonstrated. This is the conclusion that would be expected from the work upon occu-

pational group interests. Occupational groups cross all levels of abilities. If like abilities determined the larger numbers of common group interests there could be fewer common interests of occupational groups.

THE RELATION BETWEEN INTERESTS AND ABILITIES IN EDUCATIONAL FIELDS. The problem of the relation of interests and abilities in the same specialized field is a somewhat different problem. Scoring keys of common interests of occupational and educational groups have been prepared, and the resulting scores compared with ability measures in the same field of measurement.

Several investigations have compared the degree of professional interests with grades in professional schools. Cowdery (*4*) used three groups of subjects for this purpose—law students, engineering students, and medical students. It will be recalled that Cowdery developed scoring keys for the interests of these three professions. The scoring was for the students' own professional interests.

The correlations between academic grades in professional school and degrees of professional interests, as found by Cowdery, are as follows:

Medical Students	.01
Engineering Students	.34
Law Students	—.12

The groups were small so the probable errors are high. In the case of the engineering students it is ±.11. These figures indicate that academic standing (in relation to other students in professional school) has little or no relation to number of interests in one's own professional field.

The problem of the relation of engineering interests and academic grades has also been studied by Brainard (*1*) who administered his Activities Inventory for engineering students to 300 freshman engineers at the Kansas State Agricultural College. The directions were to rate the items of the inventory on a scale of scores, as follows: very unpleasant (1), quite unpleasant (2), slightly unpleasant (3), neutral (4), slightly enjoyable (5), quite enjoyable (6), very enjoyable (7). Thus, high scores are in favor of strong interests and low scores in

favor of strong aversions in the field of engineering. The inventory was made up of engineering activities. When the inventory scores are correlated with freshman grades in engineering school, the following relationships are found:

Interest score *vs.*	English grades	.14
" " "	Mathematics grades	.16
" " "	Grade for four Engineering Subjects	.17

These figures indicate that academic standing either in general or specialized subjects in professional school has little relation to interest scores in the engineering field.

The same problem has been investigated by Remmers (*13*), using the Purdue Interest Report Blank, among two groups of freshman students in professional schools, one group of agricultural students and one group of engineering students. All correlations with academic grades are lower than their probable errors. (Table LXXIV.)

TABLE LXXIV. CORRELATIONS BETWEEN INTERESTS AND ACADEMIC GRADES (REMMERS)

Groups	*Number*	*Correlation Coefficient*
Agricultural Students	78	.04 ± .08
Engineering Students	74	.06 ± .08
Total Group	152	.02 ± .05

Professional interests and educational abilities in the same professional field as indicated by the measures reported above seem not to be related to a degree much higher than a chance relationship. This means that the numbers, or degree, of one's professional interests, as scored by scoring keys of those professional interests, are not predictive of the degree of one's professional educability.

Garretson (*8*, 50-53) offers us the only information upon the relation of interests and abilities of special educational groups. The correlations are between the order of interest scores secured for certain educational groups by means of scoring keys developed by Garretson and the order of ability scores for the same group. Scores in academic educational interests are compared with grades in academic high school

and scores in Terman's Group Test of Mental Ability, as the measure of academic abilities. Scores in commercial educational interests are compared with grades in commercial high school and scores in the Ruggles Diagnostic Clerical Test, as the measures of commercial ability. Scores in technical educational interests are compared with grades in technical high school and with scores in the Minnesota Form Board and the MacQuarrie Test of Mechanical Ability, used as measures of technical abilities. Correlations for these comparisons are shown in Table LXXV.

TABLE LXXV. CORRELATIONS BETWEEN EDUCATIONAL INTERESTS AND EDUCATIONAL ABILITIES (GARRETSON)

Academic Interests *vs.* Academic Grades	.15 ± .06
Academic Interests *vs.* Terman Scores	.05 ± .06
Commercial Interests *vs.* Commercial Grades	.03 ± .06
Commercial Interests *vs.* Ruggles Scores	—.02 ± .06
Technical Interests *vs.* Technical Grades	.29 ± .05
Technical Interests *vs.* Minnesota Scores	.19 ± .06
Technical Interests *vs.* MacQuarrie Scores	.03 ± .06

The correlations between interests in special fields of stimulation and abilities in these same fields indicate a negligible relation. With academic grades in the specialized field for which the interest inventory is scored, there are nine coefficients ranging from —.12 to .34 with an average (mean) of .11 (median .06). These are correlations for scores in engineering, agricultural, medical and legal vocational interests and for commercial, academic and technical educational interests. There is little indication of any relationship between specialized interests such as those found in occupational and educational groups and the abilities demonstrated in the training for these specialized fields. The conclusion seems to follow, that specialized interests have little relation to specialized abilities, either in the field of the occupations or the field of education. This applies of course to the interests measured in the interest inventory and offers no prediction as to what might be discovered by other methods.

THE PERMANENCE OF ESTIMATED INTERESTS. The problem now becomes one of permanence of educational interests instead of their relation to abilities. In the study of the permanence of estimated interests the important problem is the *degree of permanence* that can be expected when a person makes the statement that he is interested in an educational subject. Educational interests would be expected to have some degree of permanence. The association of mental processes, the fact that we remember at all, would seem to necessitate some permanence of interests. The real question is the degree of permanence that can be expected from estimated educational interests.

EARLY INVESTIGATIONS. The pioneer study in this country of the permanence of educational interests is the one by Thorndike (*19, 20*) already referred to. The early studies in this country and in Germany (*12*) give an unsatisfactory evaluation of the significance and permanence of educational interests.

Thorndike's method was to correlate the ranked order of interests in seven general subjects, which were ranked by two groups of 100 and 344 college students, for three periods, elementary school, high school, and college. An average (median) correlation coefficient was found of .85 between elementary school interests and high school interests, of .79 between high school interests and college interests, and of .66 between elementary school interests and college interests. King and Adelstein (*9*), studied 140 college students by a slight modification of Thorndike's method and found much the same relationship: .79 between elementary school interests and high school interests, .73 between high school interests and college interests, and .59 between elementary school interests and college interests. These investigators secured the reports for the several periods at different sittings, which may have caused the slightly lower correlations. A criticism of Thorndike's method will be found earlier in this chapter which may be applied also to the investigations reported here.

THE PERMANENCE OF SPECIFIC EDUCATIONAL INTERESTS. The investigations into the permanence of the specific educational interests will be mentioned in order, according to the length of the period covered. Eighty boys and girls of the

upper three elementary school grades were asked by Davidson (*5*) to rank their studies in the order of greatest interest at two different times with an interval of one week. Individual correlations between the two rank orders were computed by the rank difference method, resulting in a median coefficient of .79.

Investigating the problem in the elementary school over a longer period Columba (*3*), on two occasions separated by an interval of a year, asked 243 children, of grades 6 to 8 inclusive, to name the school subject they liked best. There was 46 per cent permanence of specific educational interests for these children. Davidson (*5*) asked sixty-five children in the three upper grades to rank their studies in the order of greatest interest at two different times separated by an interval of a year. Individual correlations were computed by the rank difference method, giving an average (median) coefficient of .58.

Willett (*22*) has made an extensive study of the permanence of specific educational interests. He asked 136 boys and 167 girls in high school the following questions:

> What subject that you have had in high school or seventh or eighth grade do you most prefer?
> What subject did you most dislike?

These questions were repeated one year later, and it was found that the interest choices of 26.5 per cent of the boys were the same, 36.5 per cent of the girls were the same, and for the total group, 32 per cent were the same. The permanence of the dislikes was somewhat lower: 21.3 per cent for the boys, 14.4 per cent for the girls, and 17.6 per cent for the total group. A second study of 126 boys and 144 girls by Willett (*22*) showed similar results. Thirty-one per cent of the interest choices were the same (boys 32.8 per cent, girls 29.9 per cent) on the two occasions separated by a year. Of the dislikes 18.8 per cent were the same (23.5 per cent for the boys and 14 per cent for the girls).

Willett (*22*) followed up his first study with a third record two years after the first questionnaire. These results are shown in Table LXXVI.

TABLE LXXVI. PER CENT OF PERMANENCE OF EDUCATIONAL INTERESTS OVER TWO-YEAR PERIOD AS SHOWN BY THREE RECORDS (WILLETT)

	Interest Choice Same 3 Times	*Interest Choice Same 2 Times*	*Interest Choice Different 3 Times*	*Dislike Same 3 Times*	*Dislike Same 2 Times*	*Dislike Different 3 Times*
Boys	8.6	16.0	51.8	6.2	21.2	51.2
Girls	18.0	19.5	35.3	5.9	10.2	60.7
Total	14.5	18.2	41.6	6.1	14.7	56.8

The permanence of specific educational interests over the two-year period, with three records considered in the measure, is 8.6 per cent for boys, 18.0 per cent for girls, and 14.5 per cent for the whole group.

The degree of permanence over a longer period among 80 children in high school was made the subject of comparison by Davidson. (5) These children were asked to rank their elementary school subjects according to interests upon graduating from elementary school and three and four years later to rank their high school subjects according to interest. Comparisons were made for like subjects. Individual correlations by the rank difference method were computed, for which the average (median) correlation was .32.

THE PREDICTIVE VALUE OF SPECIFIC EDUCATIONAL INTERESTS DURING ADOLESCENCE. It would be expected that the predictive value of specific educational interests would be about the same as for specific vocational interests. This would seem to be true, although the work upon the permanence of educational interests is not nearly as extensive as that upon vocational interests. A comparison of the results of investigations into the permanence of educational interests (Table LXXVII) with those into the permanence of vocational interests (Chapter V) leads to the conclusion that there is not better than a 50-50 chance of predicting specific educational interests at some time in the future from present interests.

THE PERMANENCE OF INVENTORIED INTERESTS. The permanence of the interests listed in an inventory would not seem to differ when this inventory is used for educational or vocational purposes. It is the degree of permanence to be ex-

pected in the estimation of very specific interests. The evidence upon the permanence of interests, when expressed in relation to the items of the inventory, has been already reviewed in a previous chapter. (Chapter V)

TABLE LXXVII. PERMANENCE OF EDUCATIONAL INTERESTS (SUMMARY)

Period	*Research by*	*Per Cent of Permanence*	*Correlation Coefficient of Permanence*
1 week Elementary School..	Davidson	—	.79
1 year Elementary School..	Columba	46	—
1 year Elementary School..	Davidson	—	.58
1 year High School.....	Willett	31	—
1 year High School.....	Willett	32	—
2 years High School.....	Willett	15 (3 records)	—
4 years High School.....	Davidson	—	.32

But there is a slightly different problem of the permanence of interest scores when the inventory is scored for educational abilities. Jacobsen (7) correlated the interest scores made when the Minnesota Inventory was administered on two occasions and scored with the Minnesota Scoring Key of Educational Abilities (men and women). These relationships for two groups of men and women over periods of six months and a year are shown in Table LXXVIII.

TABLE LXXVIII. PERMANENCE OF EDUCATIONAL INTERESTS OVER SIX-MONTH AND YEAR PERIOD FOR MEN AND WOMEN AS SHOWN BY CORRELATION COEFFICIENT (JACOBSEN)

	Sex and Number	*For All Scored Interests in Inventory*	*For Scored Occupational Interests in Inventory*	*For Scored General Interests in Inventory*
Six-month Period ..	204 women	.58 ± .05	.55 ± .05	.50 ± .05
	157 men	.62 ± .05	.59 ± .05	.61 ± .05
Year Period	106 women	.61 ± .04	.55 ± .04	.57 ± .04
	117 men	.67 ± .05	.46 ± .05	.56 ± .05

There is very little difference in the permanence between the six-month period and the year period. There appears to be a

correlation of about .60 between ability group interests on one occasion and upon another occasion about a year later. This correlation is an indication of the permanence of interests to be expected among ability groups in college.

COMMON INTERESTS OF EDUCATIONAL GROUPS. The field of educational stimulation is analogous to the field of vocational stimulation. If there are occupational groups which can be differentiated by their interests, it would seem that there might be educational groups also differentiable by their interests. Possibly this is true in lesser degree because one's vocational life is usually more settled than one's educational life. Educational stimulation does not fill the life of the high school boy to the extent that vocational stimulation fills the life of the working man. It is possible that there are common group interests among educational groups, such as college English majors, science majors, commercial students in high school and college, etc. Cowdery's and Strong's work has bordered upon the study of educational group differences in interests among pre-professional college students. This field of educational group interests is wide open for investigation. When scoring keys are developed for educational group interests it will be possible to indicate the individual's adjustment in fields of educational training.

GARRETSON'S SCORING KEYS OF EDUCATIONAL INTERESTS. One piece of research has been undertaken from this point of view of scoring the interest inventory for the common interests of educational groups. (*8*) This investigation marks the beginning of a development that promises to be fruitful in educational guidance and selection. Garretson (*8*, 39-53) administered his "Preference Questionnaire" to 483 freshman boys in a high school of commerce, 503 freshman boys in an academic high school and 596 freshman boys in a technical high school, all in New York City. The primary groups, upon which the scoring keys were devised, consisted of 151 commercial students, 157 academic and 152 technical students, selected at random from those students whose academic grades were above the average for their classes (in typing and bookkeeping, for the first high school, in English, foreign language and civics for the second, and in shop and mechanical draw-

ing for the third). It was in this way that Garretson hoped to get rid of the influence of ability differences and to use a definite educational interest criterion for the selection of these groups. Scoring keys were made for commercial educational interests, academic educational interests and technical educational interests, for use with high school students.[6] In devising a scoring key for one educational group the two remaining groups were used as a general group with which to contrast the special educational group. Garretson used a modification of Ream's method, with weights secured by dividing the differences in percentages of the special group and the general group (which were two or more times the standard error of the difference) by the standard error of these differences.

THE VALIDATION OF GARRETSON'S SCORING KEYS. Control groups, each of 100 boys above average in academic standing in their respective high schools, were used for the validation of the scoring keys of educational interests. These groups did not include any of the members of the primary groups upon which the scoring keys were devised. The average (mean) scores of the three educational groups, and the extremes of the middle 68 per cent (two standard deviations) found by the application of the three scoring keys, are shown in Table LXXIX.

TABLE LXXIX. GARRETSON'S CONTROL GROUPS. DISTRIBUTION OF SCORES FOR GROUPS AT LEFT WHEN SCORED WITH EDUCATIONAL SCORING KEYS

	Commercial Scoring Key		*Academic Scoring Key*		*Technical Scoring Key*	
	Mean	*Middle 68%*	*Mean*	*Middle 68%*	*Mean*	*Middle 68%*
Commercial H. S. Boys	+48.8	+1.2 to +96.4	—24.0	—87.4 to +39.4	—33.6	—128.5 to +61.3
Academic H. S. Boys	—1.2	—50.1 to +47.7	+18.6	—45.0 to +82.2	—12.7	—107.0 to +81.6
Technical H. S. Boys	—47.4	—92.5 to —2.3	—81.0	—146.2 to —15.8	+140.2	+41.9 to —238.5

[6] Garretson's Scoring Keys of Commercial Educational Interests, Academic Educational Interests, and Technical Educational Interests are published (*8*, 30-37) for use with Garretson's "Preference Questionnaire" in the measurement of educational interests of high school boys.

This table is to be read downward to observe the effect of each scoring key upon the three educational groups, and from left to right to note the results of the three scoring keys upon any one group. The middle 68 per cent indicates the overlapping of scores between groups when scored with the same scoring key. The academic group overlaps the other groups, with all three scoring keys, to the greatest extent, while the technical group shows the least overlapping. The academic group is more like the commercial and technical groups than either of these groups is like the other. Also, the technical group is most unlike either of the other groups in its interests.

Coefficients of correlation (Kelley's bi-serial r^2) for the control group between the interest scores and inclusion or non-inclusion in the group for which the inventory was scored, indicate a similar situation. Correlations for the three educational scoring keys follow:

Commercial interest scores vs. inclusion or non-inclusion in commercial group ..... $.73 \pm .04$
Academic interest scores vs. inclusion or non-inclusion in academic group ..... $.56 \pm .05$
Technical interest scores vs. inclusion or non-inclusion in technical group ..... $.87 \pm .03$

The more specialized the training the greater, apparently, is the differentiation between the special educational group and the general group by a scoring key. These educational groups are distinguished from the general group by their interests in the following order: technical, commercial, academic. All the correlations show marked relationships between the interest scores and the specialized groupings. Two of the coefficients are high. There is evidence here for the existence of group educational interests among high school students. But the question is still unanswered whether or not the discrimination by the scoring keys is sufficient for the selection of individuals with specialized interests.

The critical scores used by Garretson were: 0 for the commercial scoring key, 0 for the academic scoring key and 60 for the technical scoring key. These critical scores distinguished:

84.3 per cent of the commercial from 71.0 per cent of the academic and technical students.

66.0 per cent of the academic from 79.3 per cent of the commercial and technical students.

79.0 per cent of the technical from 81.2 per cent of the commercial and academic students.

These facts are shown graphically in Figure 11.

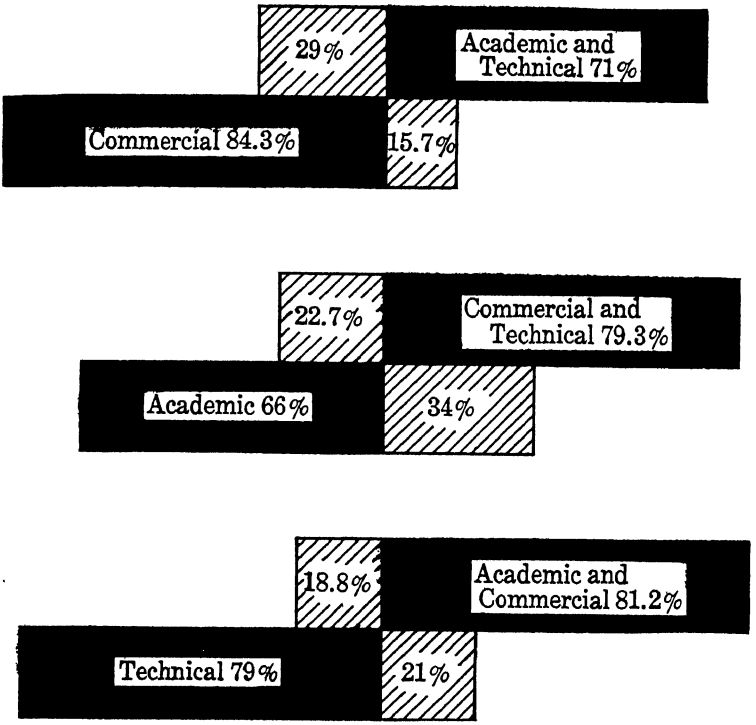

Figure 11. Garretson's control group for validation of his educational scoring keys of commercial, academic and technical interests, showing the per cent distinguished in one curriculum group from the members of the other two groups, by the use of a scoring key devised for that curriculum group (after Garretson).

THE PREDICTIVE VALUE OF GARRETSON'S SCORING KEYS. The predictive value of the scoring keys for the selection of commercially, academically and technically interested high school students is secured by subtracting the errors from correct placements of these individuals. The commercial scoring key selected 84 commercial students correctly in a hundred,

but at the same time incorrectly selected 29 in 100 non-commercial students. The predictive value of the commercial interest scoring key is 55 in 100. In the same way the predictive value of the academic interest scoring is 43 in 100 for the selection of academic students, and the technical interest scoring key has a predictive value of 60 in 100 for the selection of technical students. The guessing basis in these selections is of course one in three, as there were 100 students in the specialized groups and 200 in the non-specialized groups.

Cowdery's investigation into the selection of individuals belonging to professional groups (Chapter IV, pp. 114-20) may be compared with this as both studies contrast one interest group with two others. The discrimination of the scoring keys for both studies follows:

Cowdery's Study

Medical men, 71 per cent; Engineers, 73 per cent; Lawyers, 61 per cent.

Garretson's Study

Commercial Boys, 55 per cent; Academic Boys, 43 per cent; Technical Boys, 60 per cent.

The initial investigation in the field of occupational interest groups has the advantage over the initial investigation in the field of educational interests. Professional group interests seem to be more clearly defined. But Garretson's investigation suggests the presence of group interests sufficiently common and stable within specialized fields of education to be scored for purposes of educational guidance and selection at the high school level.

THE RELIABILITY OF GARRETSON'S SCORING KEYS. The reliability of Garretson's educational scoring keys has been calculated upon 75 cases, selected equally from each specialized group, by computing the correlation coefficient between the scores secured from the odd-numbered items and the scores secured from the even-numbered items and correcting with the Spearman-Brown formula (*8*, 48) as follows:

Commercial Interest Scoring Key	.93
Academic Interest Scoring Key	.86
Technical Interest Scoring Key	.95

EDUCATIONAL INTERESTS AND THEIR USES IN HUMAN ADJUSTMENT. Of the problems investigated in the study of educational interests, those upon which the most attention has centered seem to be least significant in the adjustment of the individual. These are the problems related to the prediction of future interests and of educational abilities or achievement. The prediction of educational abilities from estimated interests or from inventoried interests is not high, although it may add slightly to measures of intelligence in the prediction of achievement or scholarship. Educational interests have only a slight relation to abilities, or achievement, in the educational field. This is a similar conclusion to that in the vocational field.

This situation would be expected from a review of the investigation into the fluctuation of interests, which indicate that specific educational interests are just as likely to change within a year's time as they are to remain the same. Subjective interests are feelings. They rise and fade away into indifferences, and even become aversions, within a short period. However, it is just as probable as not, in dealing with statistical averages, that educational interests will be the same a year in the future. This is prediction far above a guessing basis when the number of educational subjects available for selection is recalled.

Of course, some specific interests are more permanent than others. There are common group interests. They exist in greater numbers among occupational groups than they do among ability groups. This is the reason for the difficulties arising in validating the educational ability scoring keys. While interests, as predictors of abilities and achievement, are of but slight practical value in the adjustment problem, it would seem that interests, as indicators of development, or of lack of development, in an educational, vocational, or social field, fields in which the individual is endeavoring to adjust, are of great importance. Subjective interests are an indication of the happy life, either in all-around development or in a certain field of development. Progress in understanding educational interests is indicated in the measurement of group interests, which are not ability group interests, but educational

group interests. This is a suggestion coming as well from the field of vocational interests.

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in interests can be computed, and high and low scores established.

The information tests of interests have been developed along both general and specific lines. But only in one instance (Robinson's "Range of Interest" test) has the information test been used to represent all fields of environmental stimuli. It has been prepared more often as a test of specific fields of human activities, as follows:

Agricultural Engineering Interests (Burtt)
Children's Play Interests (Terman)
Children's Readings (Wissler)
College Women's Occupational Interests (McHale)
Girls' General Trade Interests (Toops)
Men's General Trade Interests (O'Rourke and Toops)
Men's Mechanical Interests (O'Rourke)
Social Interests (Ream)

AN EARLY UNDERTAKING IN OBJECTIVE MEASUREMENT. The first use of information as the medium of measurement of interests was in 1895 when Wissler (*10*) prepared an information test to measure things that children remember from their readings. In a list of questions that Wissler sent to the school superintendents of Indiana for pupils in schools under their direction to answer, was the following:

Write the subjects of the lessons that you remember from the Reader you used last year.

About 1,600 reports were received from children using the second, third, and fourth readers, which are summarized by Wissler in Table LXXX.

TABLE LXXX. PER CENT RECALLED OF ALL LESSONS IN READERS (WISSLER)

	Second Reader	*Third Reader*	*Fourth Reader*
Per Cent Recalled of All Lessons by at Least One Pupil	99	83	67
Per Cent Recalled of All Lessons by a Great Number of Pupils	10	9	23
Per Cent Recalled of All Lessons by an Average Number of Pupils	55	34	33

An average number of pupils recall from 33 to 55 per cent of the reading lessons of a previous year, which might be accepted as a standard of the children's reading interests. Wissler stated in 1898 that he believed that the results gained by this method are a better indicator of interests than are the preferences of school children.

ROBINSON'S "RANGE OF INTEREST" TEST. Another early information test, prepared by Robinson in 1916 (*1*) with the purpose of indicating breadth of interests, is the "Range of Interest" test. This test was used by the Bureau of Salesmanship Research of the Carnegie Institute of Technology as a measure of general interests.[1] It is a test of the true-false variety, which is illustrated by the following items:

( ) 8. A broken crank shaft generally means a ruined carburetor.
( ) 19. Arson is sometimes used as a medicine for nervous disorders.

This test attempts to sample the whole range of information. Like all pioneer attempts it fell far short of the ideal. The test has only 102 problems, and would seem, on this basis, to be a very limited measure by which to secure an indication of breadth of interests.

The "Range of Interest" test has been administered to various groups of salesmen (192), minor executives (74), higher business officials (67), and large groups of high school and college students (*1*). A significant difference in range of information was found in all groups, and significant differences were indicated between groups. The range of scores in the test, which offered a possibility of 102 points, is indicated by the average percentile scores for the various groups tested (Table LXXXI). The test shows extensive differences between individuals. Whether these differences are ability differences or interest differences is not known.

MECHANICAL AND SOCIAL INTERESTS. Mechanical and social information seem to make two divisions of environmental stimuli. But this division is a common-sense one. The analysis

[1] Robinson's "Range of Interest" Test, which was published in 1917 as Test V of the Bureau of Personnel Research, Carnegie Institute of Technology, is on file in the Department of Psychology, New York University.

of social and mechanical group interests, discussed earlier in this book, indicated that there is little psychological basis for this division among subjective interests. Individuals are not divided into groups in any significant degree by their mechanical and social likes or dislikes.

TABLE LXXXI. PERCENTILE SCORES MADE BY VARIOUS GROUPS TESTED WITH "RANGE OF INTEREST" TEST (ROBINSON)

		Percentile Scores			
Groups	*0*	*20th*	*50th*	*80th*	*100th*
High School Freshmen	(?)	15.5	33.5	47.5	77
High School Seniors	(?)	41.5	54.5	66.5	78
College Freshmen	(?)	52.5	65.5	77.5	90
Salesmen	10	52.5	69.5	83.5	100
Minor Executives	28	57.5	76.5	89.5	100
Higher Officials	40	70.5	84.5	94.5	100

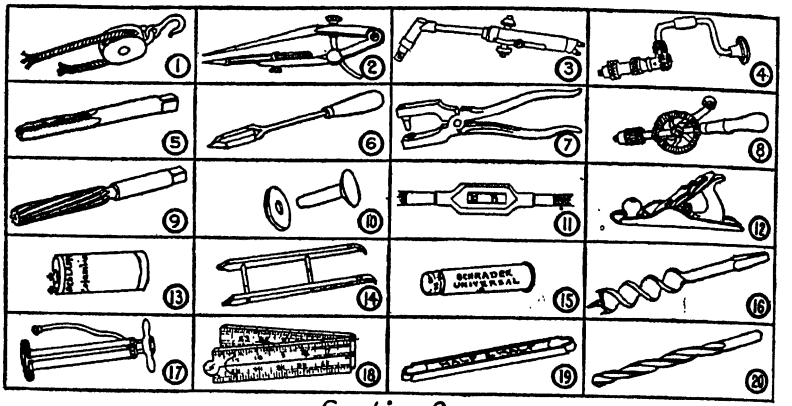
But it is still possible that there are social groups of people and mechanical groups of people, which are distinguished by objective interests. We are using here, of course, a definition of interests of what the tests measure, and objective tests of interests may measure something different to subjective measures.

The development of information tests of interests has gone forward upon this basis. The leading information test of mechanical interests is O'Rourke's Mechanical Aptitude Test, Junior Grade, which combines a measure of mechanical information and a measure of general trade information. In the field of social interests Ream's Social Relations Test combines socially acceptable information, sports information, and socially questionable information. No comparisons of mechanical and social interest tests have been made, nor is there any statistical evidence that these two groupings of objective interests do have a separate existence.

MECHANICAL INFORMATION TESTS OF INTERESTS. The beginnings of the information tests which have been used as measures of mechanical interests are obscure in the work of the post-war psychologists (1918-1921) in the Army camps in the United States where readjustment of soldiers returning to civil life was under way. In fact, the beginnings in the

Make No Marks on This Sheet—Handle Carefully

Section 1



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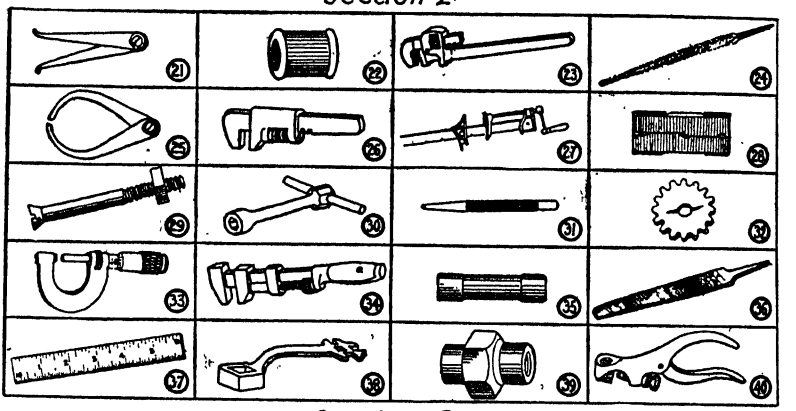

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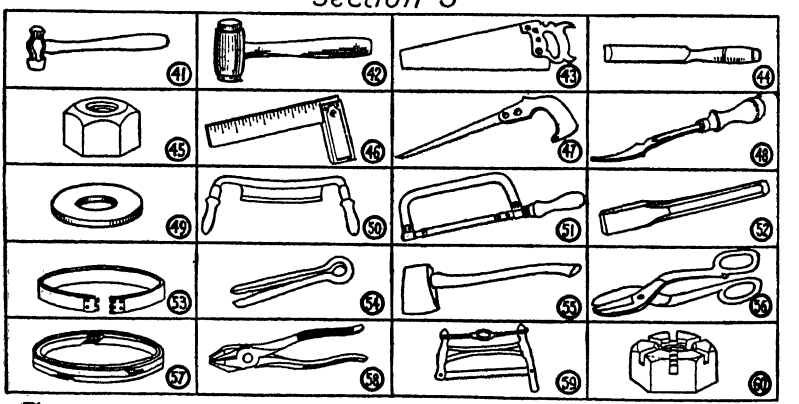

Figure 12. Rice's original Mechanical Interest Test of Information, from which all mechanical interest tests have developed. (Furnished by L. J. O'Rourke.)

THE ARMY MECHANICAL INTEREST TEST. A first revision of Rice's test (1920-21) reduced the number of pictures to 40, changed the form of presentation and listed 45 questions. This revision showed an odd-even reliability coefficient (Brown formula) of .92, which was computed for 223 subjects. The second revision (1921-22) contained 26 questions and showed an odd-even reliability coefficient (Brown formula) of .84, which was computed for 198 subjects. (*9*, 146) The reliability of this short form was considered sufficiently high for practical purposes, and was used as Test I of the Army Mechanical Aptitude Test. The time of this test is 10 minutes.

The first revision of the Army Mechanical Interest Test, including 45 questions, was used widely during the winter of 1920-21 in the Army camps of the country to assist the man in charge of assigning soldiers to Army Trade Schools in making his decision upon the soldiers' qualifications. Individual differences (*9*, 23), which are measured by the Army Mechanical Interest Test, are indicated by the distributions of scores for Camp Grant student soldiers and Columbia University students. (Table LXXXII.)

TABLE LXXXII. SCORES IN THE ARMY MECHANICAL INTEREST TEST (O'ROURKE AND TOOPS)

Groups	*Average (mean)*	*Middle 68% (Range of Two S.D.s)*
240 Camp Grant Soldiers	51	34—68
31 Columbia University Students	60	41—79

THE GENERAL TRADE INTEREST TEST. The General Trade Interest Test (called in Army offices the General Trade Test) was developed under similar conditions as the Mechanical Interest Test. O'Rourke describes a preliminary information test of 300 questions of the completion sort which was prepared under his direction at Camp Kelley in 1919 based upon questions used in general interviewing for the selection of enlisted personnel for the air service. This test was developed because men with ability were failing in the air service due to lack of interest. The test included questions on air service trades and allied civilian trades.

Based upon this original trade interest test a "General Trade Interest Test" totaling 204 questions was prepared by O'Rourke and Toops at Camp Grant in 1920 and applied to the measurement of trade interests. Its purpose was to measure amateurish knowledge and skill in the following trades: electrician, welder, motorcyclist, plumber, draftsman, engine mechanic, machinist, storage battery worker. The items of the test were of the one-word answer form, somewhat as follows:

What is solder made of? .....

This test showed a reliability coefficient (Brown formula), by the odd-even method, of .94 for 102 student soldiers in Camp Grant in 1920. (*9*, 143) The General Trade Interest Test, as it appears as Test II in the United States Army Mechanical Aptitude Test and as Part II of the O'Rourke Mechanical Aptitude Test, Junior Grade, is a development of this test.

THE ARMY GENERAL TRADE INTEREST TEST. The early 204 questions form was revised to include 140 questions by a subjective analysis of how well the questions represented the various trade groups. The scores of these 140 questions correlated .98 with the scores of the 204 questions for 191 soldier students at Camp Grant in 1920. A further revision in 1921-22 reduced the test to forty questions, which showed a reliability coefficient (odd-even correlation with application of Brown formula) of .88 for 196 subjects. Theoretically raising the number of questions to 50 brought the reliability coefficient to .91. (*9*, 142-147)

The first revision of 140 questions was widely used in the Army camps during the winter of 1920-21, along with the Army Mechanical Interest Test, to assist in selecting soldiers wishing to enter the Army Trade Schools. Individual differences (*9*, 23), which are measured by the Army General Trade Interest Test, are indicated by the distribution in Table LXXXIII for Camp Grant student soldiers and Columbia University students.

A 50-question form was later prepared, based upon the theoretical analysis of reliability, and included as Test II in the United States Army Mechanical Aptitude Test, which is used

in the selection and placement of soldiers. The one-word answer form was continued, and a time limit of 15 minutes was established for the test.

TABLE LXXXIII. SCORES IN THE GENERAL TRADE INTEREST TEST (O'ROURKE AND TOOPS)

Groups	*Average (Mean)*	*Middle 68% (Range of Two S.D.s)*
240 Camp Grant Soldiers	39	18–60
31 Columbia University Students	56	30–82

TOOPS' GENERAL TRADE INTEREST TEST FOR GIRLS. Toops (*9*, 46-62) has developed a General Trade Interest Test for Girls. There are two forms of this test. One of these forms uses the recall method in which the girl is asked to answer questions of general trade information. Some of these questions follow:

3. What part of a wall clock regulates the time? .....
34. How is a broken iron rod mended? .....
94. How many strings has a violin? .....
113. What do you drop into coffee to make it clear? .....
136. What is the watery part of sour milk called? .....
148. What oil is used in mixing gilt paint? .....

The second form, of 164 items, uses the true-false method, and includes different material. Some of these items follow:

5. A bobbin is a very small darning needle. T F
38. Neck cuts are used mostly for frying. T F
83. Sand is a good scour for saucepans. T F
122. A pass book may be purchased from the bank at a small cost. T F
133. Veal has higher food value than beef. T F
160. Cluny is a kind of lace. T F

Unfortunately, Toops' General Trade Interest Test for Girls [4] has been put to no practical use. Form I covers a wider field of mechanical knowledge than does Form II which emphasizes to a higher degree household information. The test is an excellent beginning in the preparation of an information

[4] Toops' General Trade Interest Test for Girls is given in complete form in his book entitled *Tests for the Vocational Guidance of Children* (*9*, 47-62).

test sampling the general trade interests of the girls' environment.

THE "O'ROURKE MECHANICAL APTITUDE TEST." The "O'Rourke Mechanical Aptitude Test," Junior Grade, is a measure of mechanical and general trade interests. It is prepared for use in junior and senior high schools and industries.[5] As already indicated, its content is composed of the Mechanical Interest Test and the General Trade Interest Test. O'Rourke's form of the Mechanical Interest Test is longer than the Army form, and is composed of 90 pictures. It is divided into a battery of 6 tests so that the subject is not dealing with all of the pictures at the same time as in the Army form. There are two kinds of questions running through the tests and there is a possible total of 102 points to be made. The time limit is 36 minutes, including a 6-minute practice period. One of the six tests in O'Rourke's form is shown in Figure 13.

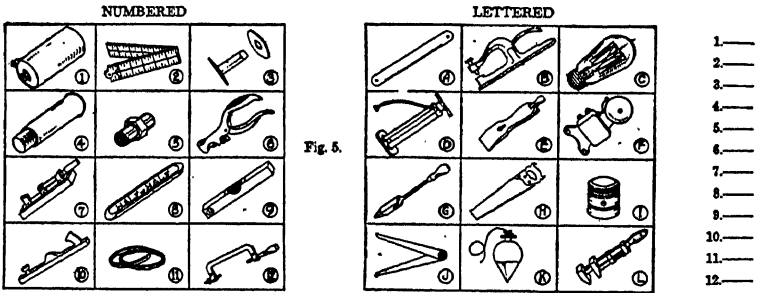

Fig. 5.

Test VII. Write a letter after 1 on the line at the right to show which picture marked with a letter is used with picture number 1. Do the same for the others.

Test VIII. In each square on the right hand side write a number or a letter to show which tools in Figure 5 you would use:

1. To mend a leak in a metal roof. . . . . ☐ ☐
2. To measure the bore of a cylinder. . . . . ☐ ☐
3. To measure the amount of air in an automobile tire. . . . . ☐
4. To set a handsaw before it is filed. . . . . ☐
5. To prevent being shocked while repairing an electric circuit. . . . . ☐
6. To prevent oil's being sucked into the cylinder. . . . . ☐
7. To make a burglar alarm. . . . . ☐ ☐
8. To fasten together two pieces of leather . . . . . ☐ ☐

Figure 13. One of the six sets of tools forming the Mechanical Interest Test in the O'Rourke Mechanical Aptitude Test, Junior Grade. The two kinds of problems are illustrated in Test VII and Test VIII.

[5] The O'Rourke Mechanical Aptitude Test, Junior Grade, is published by the Educational and Personnel Publishing Company, Washington, D. C. Directions for administration and scoring accompany the test. A Mechanical Aptitude Test, Senior Grade, is announced by the same publishers as undergoing standardization.

Part II of the O'Rourke Mechanical Aptitude Test is a 60-question multiple choice form of the General Trade Interest Test. The Army form is a 50-question one-word answer set. Some of the questions of O'Rourke's form follow:

4. A magneto is used to (1) mix gasoline, (2) drive gears, (3) pump water, (4) generate electricity, (5) cool water. .....
11. To tin a soldering iron, you would use (1) tar, (2) muriatic acid, (3) mica, (4) oil, (5) gasoline. .....
33. Molds for castings are made of (1) sand, (2) leather, (3) wool, (4) fiber, (5) rubber. .....
41. What does the cam shaft operate? (1) piston, (2) valves, (3) carburetor, (4) manifold, (5) flywheel. .....
52. The tool used to cut thread in a nut is called a (1) reamer, (2) die, (3) tap, (4) drill, (5) bit. .....

The time limit for this test is 25 minutes and the total time for O'Rourke's Mechanical Aptitude Test is about one hour. The score made in the General Trade Interest Test is the number of questions which are right, weighted four times, which gives a possible score for the test of 240. Added to the 102 points of Part I there is a possible total score of 342 for O'Rourke's Mechanical Aptitude Test, Junior Grade. O'Rourke gives a percentile distribution for the test, based on the scores made by 9,000 young men at work, ranging in age from 15 to 24 and with about average educational advantages. This distribution is shown in Table LXXXIV.

TABLE LXXXIV. PERCENTILE DISTRIBUTION, BASED UPON 9,000 YOUNG MEN, OF SCORES IN THE O'ROURKE MECHANICAL APTITUDE TEST, JUNIOR GRADE (O'ROURKE)

Score	*Percentile*	*Score*	*Percentile*	*Score*	*Percentile*	*Score*	*Percentile*
328	99	249	77	206	55	175	33
319	98	247	76	204	54	173	32
313	97	245	75	203	53	172	31
308	96	243	74	201	52	170	30
303	95	241	73	200	51	169	29
298	94	239	72	198	50	167	28

Score	Percentile	Score	Percentile	Score	Percentile	Score	Percentile
294	93	237	71	197	49	165	27
290	92	235	70	196	48	163	26
286	91	233	69	195	47	162	25
283	90	231	68	194	46	160	24
280	89	229	67	193	45	158	23
277	88	227	66	192	44	156	22
274	87	225	65	190	43	155	21
271	86	223	64	189	42	153	20
268	85	221	63	187	41	151	19
265	84	219	62	186	40	149	18
262	83	217	61	184	39	147	17
259	82	215	60	183	38	145	16
257	81	213	59	182	37	142	15
255	80	211	58	180	36	139	14
253	79	209	57	179	35	136	13
251	78	207	56	177	34	133	12

REAM'S "SOCIAL RELATIONS TEST." Ream (7) devised an information test in 1921 to show the range and type of social interests. The test is based upon the assumption that the man who has a fund of social information prefers to associate with people. This is his definition of social interests, objectively measured. The "Social Relations Test" is of the multiple choice variety, and includes 50 questions. There are two forms of this test which correlate .97 and .96 with the total score for the 100 items with 48 cases.[6] The first half of the odd-numbered items of the test are socially acceptable situations, the second half of the odd-numbered items are sports, and all the even-numbered items are questionable social situations. Some of these items follow:

Socially Acceptable Items:

2. In what organization is 11 o'clock of special significance? Elks.... Odd Fellows.... Masons.... Knights of Columbus....
4. What is a caucus? A national political convention.... An official county election.... A meeting of politicians within a party.... A secret political meeting in violation of the law....

[6] These two forms of 50 items each of Ream's Social Relations Test are out of print. Parts of them are published in the article (7) referred to in the text.

Sports Items:

2. Which of the following clubs has a wooden head? Cleek....Brassie....Niblick....Mashie....
5. What kind of race is a derby? Trotting....Pacing.... Running....Hurdling....

Questionable Items:

1. How many spots on dice make a "Little Joe"? Three.... Four....Seven....Eleven....
4. What is the name applied to short, lively chorus girls? Kittens....Ponies....Baby dolls....Footlight dodgers....

In the scoring, each correct item counts one, and the test is untimed in order to eliminate the speed factor of information tests of intelligence.

Burtt (*4*) has criticized this test from the point of view that dishonesty enters into the results. The socially questionable situations may cause suspicion as to the purpose of the test, and wrong answers to these questions may be given in order to cover up knowledge on the part of the subject of questionable social situations.

Ream's Social Relations Test has been administered to 200 salesmen. (*7*) The score in the test was found not to be predictive of success in selling. But ignorance of social diversions and lack of social contacts were found to be suggestive of lack of success, while familiarity was not necessarily favorable to success.

Occupational Interest Tests. In the measurement of subjective interests the emphasis has been placed upon occupational group interests. On the other hand, in the study of objective interests there is only one measure of a single occupational group which is based upon information. This is in the field of agricultural engineering.

Burtt's Agricultural Engineering Interest Test. Burtt (*2, 3*) experimented in 1922 with an information test, of the multiple choice variety, with items sampling the field of agricultural engineering. Forty problems are included in Burtt's Agricultural Engineering Test,[7] some of which follow:

[7] Burtt's Agricultural Engineering Test is on file in the Department of Psychology, New York University.

3. A track-laying tractor is used for: ROAD ROLLING: PAINTING: MILKING: LAYING TRACKS: PLOUGHING.
9. The best blower belts are made of: LEATHER: RUBBER: JUTE: SILK: HEMP.
17. The best water filters are made of: QUARTZ: IRON FILINGS: CALCIUM CARBIDE: CHARCOAL: ABSORBENT COTTON.
29. Picric acid is used for: ETCHING METALS: WATERPROOFING CONCRETE: POISONING COCKROACHES: BLASTING: WOOD PRESERVATION.
37. Hickory is most suitable for: SILOS: PIANO BOXES: VEHICLES: PAVING BLOCKS: LEAD PENCILS.

This test has been used in the study of forty-three students specializing in agricultural engineering at Ohio State University. (*2, 3*)

McHALE'S "VOCATIONAL INTEREST TEST FOR COLLEGE WOMEN." Kathryn McHale (*5, 6*) has experimented with a general information test as a measure of the vocational interests of college women. This test was tried out in 1922 at Goucher College, and includes 247 questions of the multiple choice variety.[8] Part I is composed of 33 questions selected from the field of law; Part II represents the field of business with 35 questions; Part III is made up of 38 questions from the field of medical science; Part IV deals with the large field of home-making in 69 questions; Part V includes 39 questions selected from the field of agriculture; 32 questions represent the field of education in Part VI. Sample questions from these various vocational fields of women's work follow:

Part I: Civil Law is *common law* *statute law* *code law* *jurisprudence.*
Part II: "It floats" is the advertising caption of *Bon-Ami* *Sapolio* *Fairy Soap* *Ivory Soap.*
Part III: Arsenic is *a tonic* *a cathartic* *a refrigerant* *an emetic.*
Part IV: The feeder of a sewing machine is the *bobbin* *shuttle* *thread arm* *teeth plate.*
Part V: A baby calf should be given every day *3* *6* *9* *12* quarts of milk.

[8] A Vocational Interest Test for College Women (McHale), published in 1930 by The American Association of University Women, 1634 Eye St., N.W., Washington, D. C.

Part VI: Education means *pouring in subject matter* *growth* *discipline* *inquiry.*

OTHER INFORMATION TESTS. Terman (*8,* 385-439) has used an information test in the study of mental traits of gifted children for the purpose of surveying the interests of children in plays, games, and amusements. This test will be found with the other measures of play interests in Chapter IX (pp. 316-8).

THE PURPOSE OF THE INFORMATION TEST. The information test has been widely used in the measurement of abilities although in this use it has differed somewhat in composition. Only those information tests are mentioned here which have been tried out with the purpose of measuring interests.

The trial of the information test in the measurement of interests has been largely confined to measurement in a fairly specialized field of human reactions, such as mechanical interests, social interests, play interests, intellectual interests and various combinations of occupational interests. In all tests, however, the assumption is made that one possesses interests in a certain field of human reactions because he knows something about that field of activity. Interests are considered to be represented by knowledge or information. The person who is interested in a field is thought to absorb and retain information in that field. Amount of information is used as the criterion of measurement of interests.

VALIDATING THE INFORMATION TEST AS A MEASURE OF INTERESTS. The information tests, which have been used as indicators of interests, have been compared with various criteria of interests as well as with measures of abilities in an attempt to validate them. A survey will be made of this literature to see what the information tests of interests measure. If they compare favorably with ability measures, they are, then, measures of abilities; if they correlate low with ability measures they are measures of something else besides abilities; and if they correlate high with good criteria of interests they are, then, validated as measures of interests.

THE INTERCORRELATION OF INFORMATION TESTS OF INTERESTS. Often when a new psychological measure is made it is correlated with an older established measure in its field

of measurement, in order to see if the new test measures the same thing as the old test. If one information test were established as a measure of interests the correlation of other tests of interests with this test would be a validation measure. At present no information test can be accepted as a measure of interests. But a high intercorrelation of information tests of interests would be an indication that the tests measure the same thing, and if the assumption is made that information is an evidence of interests, then the tests are interest tests.

The Army Mechanical Interest Test has been compared by O'Rourke and Toops, from data collected at Camp Grant in 1920, with the Army General Trade Interest Test. (*9*, 35-37) Both tests were administered to 152 soldier students in four vocational courses. Correlations between the tests are reported in Table LXXXV for various vocational groups.

TABLE LXXXV. RELATION BETWEEN THE ARMY MECHANICAL INTEREST TEST AND THE ARMY GENERAL TRADE INTEREST TEST (O'ROURKE AND TOOPS)

Vocational Course	*No. in Group*	*Correlation Coefficient*
Automotive	87	.57 ± .05
Electrician	34	.68 ± .06
Machinist	23	.73 ± .07
Bookkeeping	37	.70 ± .06
Average { Mean		.67
Average { Median		.69

Similar investigations with groups of students of various levels of educational achievement are reported by O'Rourke and Toops (*9*, 17-23), as shown in Table LXXXVI.

The evidence from the intercorrelation of the Army Mechanical Interest Test and the Army General Trade Interest Test indicates that these two tests, which are based upon information in fields that are somewhat similar, have a substantial relationship. The average (mean) of all the correlations between the Army Mechanical Interest Test and the Army General Trade Interest Test is .66 (median .69).

A high correlation between information tests of like material would be expected, and the closer alike the materials of

two tests are, the higher, of course, would be the correlation. This correlation might be interpreted as a reliability coefficient. It is in a sense the repetition of another form of the same test. It might be used as a correlation between the amount of like information in the two fields of measurement. Here it is interpreted as a comparison of two measures of similar interests. On the other hand, we do not know that it is not a comparison of two measures of abilities.

TABLE LXXXVI. RELATION BETWEEN THE ARMY MECHANICAL INTEREST TEST AND THE ARMY GENERAL TRADE INTEREST TEST (O'ROURKE AND TOOPS)

Groups	*No. in Group*	*Correlation Coefficient*
1. Elementary School Boys (Ages 12-15) ...	145	.50 ± .04
2. Pre-Vocational Eighth Grade Boys	208	.70 ± .02
3. Retesting of Group 2, one year later, in high school	145	.50 ± .04
4. Columbia College Students	31	.89 ± .03
Average { Mean		.65
Median		.60

THE COMPARISON OF INFORMATION TESTS OF INTERESTS WITH ESTIMATES AND GRADES AS CRITERIA OF VALIDITY. Estimates have been used as a validity criterion. Estimates of interests, estimates of abilities, and estimates of success or achievement are criteria with which the test scores may be compared to see what the tests measure. Burtt (*2, 3*) administered his information test of agricultural engineering interests to 43 students in agricultural engineering. First, interest, and then ability, in agricultural engineering were estimated by instructors for these students. The scores in Burtt's Agricultural Engineering Interest Test correlated with the interest estimates, .10, and with the ability estimates, .28. With the influence of ability partialed out of the correlation between instructors' estimates of interest and the test scores, the correlation was reduced to —.10. With the influence of interest partialed out of the correlation between instructors' estimates of ability and the test scores, the correlation remained .28. The conclusion from these data is that Burtt's interest test is

more a test of abilities than of interests, but in neither case does it compare favorably with criteria. These are results, it will be remembered, from the use of an occupational information test of agricultural engineering.

McHale (*5, 6*) has administered her Vocational Interest Test for College Women to 133 Goucher College juniors. She also secured statements from these girls of vocational choices, which were selected from a list of 33 occupations in the field of women's work. The girls' first choices were classified into five occupational fields and correlated with test scores in these fields. For the field of educational and social science the correlation was .21, for homemaking —.02, for business .17, for science .05, and for law .33. The average (mean) correlation between estimated occupational interests and information scores in these vocational fields is .15 (median .17), which indicates that a negligible relationship exists. The test is not a measure of interests according to this criterion of interests.

But when estimates of success after graduation by employers are used as criteria, high correlations with test scores are found. For the field of educational and social science the correlation was .71, for business .81, and for science .67. The average (mean) is .73 (median .71). If estimated success is regarded as a criterion of interests, then the test is a measure of interests. But this is a doubtful criterion of interests as already indicated in the study of subjective interests.

Data were collected by O'Rourke at Camp Grant in 1920 for a comparison of the Army Mechanical Interest Test with achievement estimates as criteria (*9*, 35-37). The test was administered to 152 vocational student soldiers in the automotive, electrical, machinist, and bookkeeping courses at the beginning of this training. Ratings by instructors of course success or achievement were made after the completion of the course. Correlations with this criterion of trade proficiency are shown in Table LXXXVII. The average correlation of .24 (mean and median) between scores in the Army Mechanical Interest Test and these estimates suggests a low relationship although for two of the courses the correlations are .43 and .50.

TABLE LXXXVII. THE RELATION BETWEEN THE ARMY MECHANICAL INTEREST TEST AND ESTIMATES OF VOCATIONAL ABILITY (O'ROURKE AND TOOPS)

Vocational Course	*No. in Group*	*Correlation Coefficient*
Automotive	61	.05 ± .09
Electrician	34	.50 ± .34
Machinist	24	.43 ± .10
Bookkeeping	33	−.01 ± .12
Average { Mean		.24
Average { Median		.24

Data were collected by L. W. Sackett at Camp Grant in 1920, comparing various measures for a group of 27 student soldier bookkeepers. The Army Mechanical Interest Test was administered to this group, and a correlation of .20 is reported (*9*, 63-67) between scores in this test and a criterion of bookkeeping ability, made up of teachers' estimates, school grades, and a measure of school progress.

The Army Mechanical Interest Test has also been administered by O'Rourke and Toops to a group of 208 eighth grade pre-vocational school boys, for whom average grades in the two or three courses selected for training by each boy were used as a criterion for comparison. A correlation coefficient of .33 ± .04 is reported (*9*, 31-35) between the interest test and this criterion. For a group of 100 of these boys who were selected because they entered high school, the correlation was reduced to .02 ± .07. This correlation was raised to .16 ± .07 by eliminating the grades in machinist and printing courses, which were considered unreliable.

Similar comparisons are made for the above groups between scores in the Army General Trade Interest Test and the same criteria. For the 152 student soldiers at Camp Grant the average correlation with instructors' ratings of achievement is about .30. (*9*, 35-37) The correlations are shown in Table LXXXVIII. These student soldiers took the unrevised 204 questions form of the Army General Trade Interest Test. Correlations are also given for the revision of this form of 140 questions.

For the 208 eighth grade pre-vocational school boys the

correlation between average grades and the interest test was .41 ± .04. (*9*, 31-35) For the 100 boys who entered high school the correlation became .07 ± .07, which was later raised to .32 ± .06 by discarding the grades of the machinist and printing courses.

TABLE LXXXVIII. THE RELATION BETWEEN THE ARMY GENERAL TRADE INTEREST TEST AND ESTIMATES OF VOCATIONAL ABILITY (O'ROURKE AND TOOPS)

Vocational Groups	*No. in Group*	*Correlation Coefficient* 204 *Question Form*	140 *Question Form*
Automotive	65	.19 ± .08	.20 ± .08
Electrician	35	.51 ± .08	.53 ± .08
Machinist	23	.46 ± .11	.47 ± .11
Bookkeeping	28	.02 ± .13	.02 ± .13
Average Mean		.30	.31
Average Median		.32	.33

Here is a fairly complete analysis of several of the information tests of interests in comparison with criteria. These comparisons with interest estimates, ability and achievement estimates, and school grades are shown in Table LXXXIX.

TABLE LXXXIX. COMPARISON OF INTEREST TESTS WITH CRITERIA (SUMMARY TABLE)

Criterion Used	*Correlation*	*Research Worker*
Estimates of Interests	.10	Burtt
	.15 (mean)	McHale
Estimates of Ability, Achievement and Success	.24 (mean)	O'Rourke
	.28	Burtt
	.30 (mean)	O'Rourke
	.31 (mean)	O'Rourke
	.73 (mean)	McHale
School Grades	.16	O'Rourke and Toops
	.32	O'Rourke and Toops
	.33	O'Rourke and Toops
	.41	O'Rourke and Toops
Combination of Estimates of Achievement and School Grades	.20	Sackett

In this analysis the two comparisons with subjective interests are unsatisfactory. Most of the other comparisons are with criteria of achievement and success in vocational operations. If objective interests were known to be related to achievement these correlations of about .30 (mean .33; median 30.5) would be unsatisfactory. But subjective interests have been found not to be closely correlated with achievement measures. Similarly we find objective interests not closely correlated. There is the suggestion here that these information tests may measure interests to a slight degree and the relationship with achievement is the one to be expected in all interest measurement.

THE COMPARISON OF INFORMATION TESTS OF INTERESTS WITH ABSTRACT ABILITY TESTS. It would be interesting to know what is the relation of the information interest test to standard intelligence tests and tests of abstract abilities. Test VI, the revision of Army Alpha by the Bureau of Business Research of the Carnegie Institute of Technology, was administered by Ream, along with his Social Relations Test of Interests, to 48 salesmen. (*7*) Correlation Coefficients for the various parts of the test and scores in the intelligence test are shown in Table XC. These are substantial relations. On the

TABLE XC. CORRELATION BETWEEN SOCIAL RELATIONS TEST AND INTELLIGENCE (REAM)

For Score in Socially Acceptable Items	.71
For Score in Sports Items	.53
For Score in Questionable Items	.38
For Total Score in Test	.60

other hand McHale (*5, 6*) found low correlations between her Vocational Interest Test and intelligence. She compared the scores in the interest test and the scores in the Thorndike Intelligence Examination for 133 Goucher juniors in five fields of vocational activity. For the field of educational and social science the correlation was —.08, for homemaking .19, for business .30, for science .10, for law .28. The average (mean) was .16 (median .19).

The Army Alpha Examination was administered by O'Rourke and Toops (*9*, 31-35) to the 209 pre-vocational

boys along with the other tests. A correlation coefficient of .42 ± .04 was found between the Army General Trade Interest Test and the Army Alpha examination. But when this correlation was computed for 145 of these boys who were in high school one year later it was reduced to .23 ± .05. Between the Army Mechanical Interest Test and the Army Alpha for the 208 boys the correlation was .30 ± .04. For 145 of these boys who entered high school the correlation remained the same: .30 ± .05.

The data collected by Sackett at Camp Grant compared various tests of abstract abilities, largely clerical, with the Army Mechanical Interest Test for 27 student soldier bookkeepers. (*9*, 63-67) Correlations with the measures of abstract abilities are reported in Table XCI.

TABLE XCI. COMPARISONS BETWEEN THE ARMY MECHANICAL INTEREST TEST AND MEASURES OF ABSTRACT ABILITIES (SACKETT)

Army Mechanical Interest Test Correlated with	*Correlation Coefficient*
Trabue Sentence Completion Test	.13 ± .13
Substitution of Code Letters for Numbers Test	.28 ± .12
Filing Test	.02 ± .13
Copy Checking Test	.33 ± .12
Number Copying Test	.22 ± .12
Army Arithmetic Test	.18 ± .12
Army Reading Test	.29 ± .12
Average { Mean	.24
Average { Median	.22
Army Alpha Intelligence Test	.39 ± .11

There are 21 correlations reported from comparisons of interest tests and measures of abstract abilities. They range from —.08 to .71, and there is an average correlation of .29 (mean and median). For seven of these correlations with general intelligence tests, ranging from .16 to .60, the average (mean) is .34 (median .30). For seven of these correlations with special abstract abilities tests the average (mean) is .24 (median .22). The interpretation might be drawn that the relationship between information tests of interest and tests of abstract abilities, including general intelligence tests, is low.

But these correlations are more or less meaningless when it is recalled that the comparisons are between interest measures in fields of human reactions different from those of the ability measures. The correlations, averaging at .16 (mean), which were reported by McHale, are between an interest test of occupational information and a general intelligence test. The correlations, averaging at .24 (mean), which were reported by Sackett, are between an interest test of mechanical information and tests of specialized abstract abilities, such as arithmetic and filing. On the other hand, Ream's Social Relations Test correlates .60 with a general intelligence test. These two fields of measurement, the social and abstract, are frequently considered to be different, but correlations between ability tests in the social and abstract fields usually run fairly high. It is difficult to give any meaning to these correlations. The real test of the relation between information tests of interests and tests of abilities will be within the same field of human reactions. This can be done in the field of mechanical activities where we have information tests of interests and tests of mechanical abilities.

A Comparison of Mechanical Interest Tests and Mechanical Ability Tests. The Army Mechanical Interest Test has been compared with various measures of mechanical abilities. Correlation coefficients between the Army Mechanical Interest Test and three measures of mechanical abilities, the Stenquist Tests, are reported for two groups of school boys by Toops and O'Rourke (*9*, 17-23), and are shown in Table XCII.

Table XCII. Comparisons Between the Army Mechanical Interest Test and Tests of Mechanical Abilities (Toops and O'Rourke)

Army Mechanical Interest Test Compared with the	*Groups*	*Correlation Coefficient*
Stenquist Assembling Test Series I	145 Elementary School Boys	.41 ± .05
	145 Secondary School Boys	.24 ± .05
Stenquist Picture Test I	145 Elementary School Boys	.44 ± .05
	145 Secondary School Boys	.50 ± .04
Stenquist Picture Test II	145 Elementary School Boys	.46 ± .04
	145 Secondary School Boys	.50 ± .04

The elementary school group were boys from 12 to 15 years of age and the secondary school boys were all freshmen in high school. The three ability tests are the Stenquist Assembling Test of Mechanical Ability, Series I, and the Stenquist Mechanical Aptitude Tests I and II.

The correlations between the Mechanical Interest Test and the Mechanical Ability Tests indicate a substantial but not a significant relationship. The average (mean) correlation is .43 (median .45). The correlations are high enough to suggest that to some degree the mechanical information test of interests and the mechanical ability tests measure the same thing.

But when it is considered that the Stenquist Picture Tests are of the information variety it seems peculiar that the correlations between the interest test and these two tests are no higher. In fact, the Stenquist Picture Tests and the Army Mechanical Interest Tests might be regarded as similar measures. Bearing out this contention are the correlations between the Assembling Test and either of the Picture Tests, which are about .40. This leaves the Assembling Test as the only true test of mechanical abilities with which there are two correlations of .41 and .24, indicating the relationship to expect between measures of interests and abilities in the mechanical field where information tests are used as the measures of interests.

Similar comparisons with these measures of mechanical abilities are reported by Toops and O'Rourke (*9*, 17-23) for the Army General Trade Interest Test. The correlation coefficients are shown in Table XCIII.

Here the relationship is much lower than in the comparisons between these ability measures and the Army Mechanical Interest Test. The average (mean) correlation is .28 (median .29) while for the Army Mechanical Interest Test it is .43. The explanation would seem to lie in the fact that the materials of the Army General Trade Interest Test represent a different field to the Ability Tests.

Information tests of interests correlate to a fairly substantial degree with ability measures in the same field of reactions. This is indicated by the correlation between the Army Mechanical Interest Test (also the Stenquist Picture Tests which may

TABLE XCIII. COMPARISONS BETWEEN THE ARMY GENERAL TRADE INTEREST TEST AND TESTS OF MECHANICAL ABILITIES (TOOPS AND O'ROURKE)

Army General Trade Interest Test Compared with the	*Groups*	*Correlation Coefficient*
Stenquist Assembling Test Series I	145 Elementary School Boys	.33 ± .05
	145 Secondary School Boys	.17 ± .05
Stenquist Picture Test I	145 Elementary School Boys	.27 ± .05
	145 Secondary School Boys	.31 ± .05
Stenquist Picture Test II	145 Elementary School Boys	.33 ± .05
	145 Secondary School Boys	.24 ± .05

be regarded as information tests of interests) and the Stenquist Assembling Test, which is used as the measure of mechanical abilities. This relationship is expressed by a correlation coefficient of about .40. Correlations between the Stenquist Picture Tests and the Stenquist Assembling Test of .36, .40, .42, and .45 are reported by Toops and O'Rourke for the above groups. Evidently, when the measures are in the same field of human reactions ability tests and interest tests of the information variety measure the same thing to a substantial degree.

SUMMARY OF FACTS CONCERNING THE INFORMATION TEST OF INTERESTS. Below is a summary of the facts of validation, reliability, and use, which are available from the trial of the information test as a measure of interests. These should lead to some conclusion of the value of this kind of measure in the objective measurement of interests.

1. The information test measures a wide range of individual differences. This has been shown to be true in numerous studies and a measure of this kind is necessary if clear-cut discrimination between individuals is to be made.

2. The information test is applicable to general and to special measurement. It can be made to sample all human reactions or it can be limited to a specialized field of reactions. The only test attempting to sample the whole field of human reactions is the one by Robinson, the "Range of Interest" Test, of 102 items. This test would seem to be too limited in its sampling to be a reliable test of general information. Of

course, tests like the Army General Trade Interest Test and McHale's Vocational Interest Test for College Women are quite general in their sampling of stimulating objects. The term general and special are relative. Special information tests have been developed to measure social, mechanical, trade and play interests. In only one instance has the test been made to represent one occupational field (Burtt's Agricultural Engineering Test) which is the line of development of the scoring keys for the interest inventories.

3. The information test has a high reliability. The Army Mechanical Interest Test and the Army General Trade Interest Test are shown to have a reliability of about .90. This is as high as most tests of abilities. The intercorrelation of about .66 of these two information tests of interests, which are tests of somewhat similar concrete information, but with differences sufficient to lower the correlation considerably, is further evidence of the reliability of the information test.

4. Comparisons with criteria of validity, in the form of estimates and school grades, do not offer any conclusive evidence of what the information test, adapted to the measurement of interests, measures. Burtt found a better relation between teachers' estimates of ability of college students and the test scores than between teachers' estimates of interest and the test scores. Both correlations were very low, however. McHale found very low correlations between the test scores and college student estimates of vocational interests (mean .15). She found, however, a fairly high correlation between test scores and estimates of success or achievement of these college students by employers (mean .73). All comparisons by O'Rourke and Toops for the Army interest tests are with achievement estimates or measures in the fields closely allied to the tests. With grades in vocational courses the correlation for the Army Mechanical Interest Test is .33 for boys, which is reduced to .16 upon selection as the group entered high school. For the Army General Trade Interest Test it was .41, which is reduced to .32 on selection. For soldier students, with teachers' estimates of course success, the correlations ran from —.01 to .50 (mean .24) for the Army Mechanical Interest Test and from .02 to .53 (mean .30) for the Army General

Trade Interest Test. These correlations indicate that the information test applied to the measurement of interests has a negligible relation with ordinary estimates of interests and a slight relation with estimates and measures of achievement (mean of all correlations .33).

5. The information test, when applied to the measurement of interests, correlates fairly low with general intelligence tests (mean .24). This situation holds a pleasant surprise for those endeavoring to apply the information test to the measurement of interests. Used in the measurement of abilities the information test correlates very high with other tests of abstract abilities. The information test, Test VIII, of the Army Alpha Examination correlates .93 with the remaining seven tests, which is next to the highest individual test intercorrelation for the Army Alpha. With the Stanford-Binet individual examination this information test of the Army Alpha examination correlates .72, which is about average for the eight tests of Army Alpha. This suggests that the information test, prepared for use in the measurement of interests, is a somewhat different measure from that prepared for use in the measurement of abilities. On the other hand, discounting this suggestion is the fact that the measures of interests, which were used, are in different fields of measurement to the general intelligence tests. In all measurement it is found that the more different the material in two tests the lower the correlation between them.

6. The Army Mechanical Interest Test correlates low with special measures of abstract abilities. Special ability tests in the clerical field, arithmetic, language, reading, copying, checking, and so on, all correlate below .35 (mean .24) with this test. This would be expected. The real question here is the relation of mechanical interest tests and mechanical ability tests.

7. The mechanical interest tests also correlate only fair with mechanical ability tests. But these correlations are not much lower than the intercorrelations of tests purporting to be measures of mechanical abilities, the Stenquist Picture Tests, which correlate about .40. Average (mean) correlations for the Army Mechanical Interest Test and the Army General Trade

Interest Test with the Stenquist Assembling Test, which is accepted as a measure of mechanical abilities, are .33 and .25 respectively. With the Stenquist Picture Tests the correlations are higher for the Army Mechanical Interest Test, with an average (mean) of .48. For the Army General Trade Interest Test this average (mean) is .28. The Army Mechanical Interest Test and the Stenquist Picture Tests are somewhat alike as the correlation indicates and as would be suggested by comparing the testing materials. The Stenquist Picture Tests compare favorably with other mechanical measures applied to the measurement of interests.

CAN THE INFORMATION TEST MEASURE INTERESTS? Theoretically it would seem that knowledge and interests would go hand in hand, that where one is interested he will be informed and where he is not interested, knowledge will be less. The assumption might be made that information *is* objective interests, and if such a measure is included in an ability test then interests are being measured there. If, in mental measurement, work were done with this assumption there would have to be quite a revision of our concept of abilities. This leads to the safe position that information tests measure information, which is not quite acceptable to all because some information tests correlate high with ability measures and some do not. This seems to depend upon the construction of the information test.

The task of measuring interests by amount of information would be different according to the training received by the individual in the field of measurement. Burtt attempted to measure interests in one occupational field among agricultural engineers in college, which is, of course, at a high experience level. The theory behind Burtt's measurement of interests will be given in his own words. (*4*, 302)

> There is some ground for the assumption that if a person is interested in a certain field he will pick up information about it—will be more familiar with the terminology and with less obvious details that would presumably be overlooked by a person who lacked that interest. Consequently, an information test may give some indication of interest if the items are carefully selected. It is insufficient to ask questions which anyone from casual observation would be able to answer. It is necessary to go further into details such as one would not encounter

unless he had made definite effort to pursue the particular line under consideration. . . . In selecting items (for Burtt's Interest Test of Agricultural Engineering) ordinary things that the student would meet in their everyday work in the college course were avoided. Technical journals were consulted and out-of-the-way things were selected on the theory that the student who was interested in this profession would naturally go beyond the ordinary required work of the classroom and would read additional things, such as technical journals.

It may be that the intensity of the measurement aimed at, the few items included in the test and the exactness of the information demanded, accounts for the higher correlation for Burtt's test with estimates of ability than with estimates of interest. Also, the lack of success in this measurement by Burtt may be an inherent difficulty in the measurement of interests among those individuals already well along in their training.

The point of view of Toops will be stated in his own words as he has applied the theory to his work upon information tests of interests in the Army.[9]

The purpose behind the "Army General Trade Interest Test" was to obtain a measure of amateurish skill and knowledge as a means to prognosticating the student's progress in shop trade school work. Perhaps the theory may be said to be somewhat as follows:

a. A student who has a *real* interest in a subject, as versus a *superficial* one, will have attained to amateurish skill and knowledge.
b. Through the usual experiences of human beings, interested students will not have attained to a very considerable skill; consequently, it seems useless to include a large number of "difficult" questions which only people somewhat experienced in actual practice would be likely to answer.
c. It might therefore be said that we are attempting to measure the *"attainment* side of interests" as opposed to the *"emotional* side of interests." And we did this under the conviction that the attainment side is the more fundamental and certainly the more readily measurable aspect of interests.

It would seem from this statement that information tests of interests must not make too definite requirements or they become tests of abilities. But they must be as extensive as possible, that is to say, they must cover the field under investiga-

[9] Published by courtesy of Herbert A. Toops from correspondence under date of July 11, 1929.

tion completely, according to Toops' theory. Interests, as measured in the reactions of the individual, are the superficial attainments. The number of these superficial attainments in a well-defined field of stimulation, contrasted with those of other people, is the individual's interest score.

If information tests are to be successful in the measurement of objective interests it would seem that they must be built upon the theory of extensity of questions. There must also be an allowance in the scoring system for a degree of superficiality of answer to these questions. This superficiality of answer, of course, would be an objectively measurable degree of exactness or correctness. On the other hand, information tests of abilities are intensive and require exactness in answers. The problem of the extensity of questions is evidently the important one in application of the information test to the measurement of interests. Burtt sought the exceptional as test stimuli, that which interested observation might pick up and uninterested observation would pass over unnoticed. Toops emphasizes the achievement or success in gaining this extensive information. It would seem that less obvious details should be included in the test. These should cover the field of investigation thoroughly. But the answers to questions would not be expected in the exactness required in the ability measures. Then too, the exactness of information expected would be relative, dependent upon the stage of development of the group in the field to be tested.

Finally, all the work upon the measurement of interests by means of information may be leading nowhere as far as interest measurement is concerned. Such an analysis of results as is included in this chapter is subject to wide error in interpretation. There is no valid evidence that something different to abilities is measured by information tests. What is thought to be an evidence of interests in these measures of information may be but a measure of the extent to which these tests are measures of the same abilities. The safest conclusion, as already stated, is that information tests measure information. But the theory persists that in achievement, as evidenced in the acquisition of information, there is present an effect of interests as well as of abilities.

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CHAPTER IX

OBJECTIVE INTERESTS (*Continued*)

INTERESTS MEASURED BY FREE ASSOCIATION, DISTRACTION AND OTHER OBJECTIVE METHODS

INFORMATION forms the basis of other measures of objective interests, such as the free association method. The purpose behind the free association method in its application to the measurement of interests is to measure the amount of information within a certain defined field of human reactions such as a science or an occupation.

THE FREE ASSOCIATION METHOD. There are two forms of the free association method, the continuous and the discrete. The continuous form requires the person being tested to react by any word that comes to mind, or to start with a key-word, and then to say (or write) as many words as possible until told to stop. The rapidity of free associations is the measurement. Results show a consistent increase in number of associations with increases in mental age. For this reason the continuous form of the free-association test has made a place for itself among the measures of abilities. One of the tests of the Stanford-Binet individual intelligence examination (naming sixty words in three minutes) is of this kind.

The other form, the discrete, is the one most widely used in the investigation of peculiarities of verbal associations. In this method the person being tested is instructed to react to a stimulus word with the first word that comes to mind, the first word that is associated with it. The standard test is the Kent-Rosanoff, which includes a list of 100 stimulus words and frequency tables of reactions showing commonness of response to the stimulus word. Other investigators have worked out average times for reactions to indicate delayed responses. The test is of special value in indicating such traits as originality of thought, conscious and unconscious deceptions, special trends of thought, dominant interests, emotional conflicts and repressions.

It would seem possible to apply both the continuous form

and the discrete form of the free association method to the measurement of interests. Both forms might be scored for frequency of reactions in definite fields of activity. In this way the free association method would indicate development of information in the individual. As in the information test, special and general measures might be developed. The continuous form of the free association method would find use as a specialized measure, the "key-word" defining the field. The discrete form would seem to be applicable to both special and general measurement by proper sampling of stimulus words.

WYMAN'S FREE ASSOCIATION TEST OF INTERESTS. Jennie B. Wyman (*10*, 455-483, *11*) has carried on an extensive investigation with the discrete form of the free association method as a measure of verbal interest reactions. She limited her study to children, and has dealt with three special fields of interest reactions: intellectual, social, and activity interests. The three fields of interests are defined by Wyman as follows:

Intellectual Interest: A person with a high degree of intellectual interest is one interested in knowing—interested in getting at the meaning of things—the person who elects to "know" rather than to "do."

Social Interest: Interest in persons—do not confuse social interest with social performance. The most popular person is not necessarily the one with the highest social interest.

Activity Interest: A person with a high degree of activity interest is the one who is interested in "doing" things—the leader—the one quick to respond—but not necessarily the one fondest of outdoor games. A person who prefers to "take part" rather than to "watch."

In a series of preliminary experiments Wyman developed a test of 120 stimulus-words, balanced equally, to stimulate word associations in these three fields of interest expression. This test is reproduced here.

WYMAN'S FREE ASSOCIATION TEST OF INTERESTS

By Jennie B. Wyman
University of British Columbia, Vancouver, Canada

The Free Association Stimulus Words

The stimulus word is presented visually and at the same time pronounced by the experimenter. Responses are in writing. One stimulus

word is given every eight seconds. The total time of the test is about 16 minutes. Group administration is feasible.

120 Stimulus-words Balanced Equally for Response in Intellectual, Social, and Activity Fields of Interests

1. summer	31. evening	1. night	31. sundown
2. easy	32. hard	2. simple	32. difficult
3. diamond	33. ring	3. gem	33. dress
4. tire	34. play	4. join	34. enjoy
5. dog	35. learn	5. control	35. need
6. fair	36. band	6. white	36. music
7. school	37. dark	7. college	37. black
8. help	38. platform	8. protect	38. stage
9. nature	39. pity	9. sky	39. watch
10. active	40. thrill	10. restless	40. excite
11. dream	41. idle	11. wonder	41. useful
12. shock	42. hero	12. fault	42. castle
13. joy	43. vacation	13. pleasure	43. holidays
14. dislike	44. master	14. detest	44. captain
15. nut	45. bat	15. paper	45. rod
16. go	46. fun	16. travel	46. mischief
17. angel	47. power	17. princess	47. rain
18. nice	48. interested	18. alone	48. interesting
19. water	49. fond	19. current	49. good
20. boy	50. trip	20. girl	50. journey
21. wish	51. make	21. desire	51. form
22. museum	52. yard	22. history	52. island
23. delight(ed)	53. aim	23. contented	53. try
24. work	54. fairy	24. train	54. giant
25. cave	55. exercise	25. adventure	55. game
26. pleasant	56. companion	26. happy	56. friend
27. house	57. career	27. marble	57. science
28. imagine	58. fire	28. invent	58. camp
29. range	59. like	29. country	59. prefer
30. admire	60. great	30. attract	60. grand

SCORING THE FREE ASSOCIATION TEST FOR GROUP INTERESTS. Group interests are separated from non-group interests in the scoring plan used by Wyman. Children with intellectual interests, or with social interests, or with activity interests are distinguished from other children by the scoring technique. Wyman's method follows closely the Ream-Cowdery-Strong method of scoring the interest inventory.

A group of seventh grade pupils, all between the ages of 10

and 14 years, served as the primary group for deriving the scores to be assigned the free association responses to the stimulus-words. Teachers' estimates[1] were used in grouping these children, as follows:

Groups	*Number*
With intellectual interests	69
Without intellectual interests	58
With social interests	71
Without social interests	67
With activity interests	71
Without activity interests	56

The frequency of each association reaction word for the "with" group and for the "without" group was found. This was reduced to percentages and the difference between these percentages was secured, also the standard deviation of the difference between the two. The score assigned to an association reaction word was the difference between the per cent of the group "with" and the per cent of the group "without," divided by the standard deviation of this difference. This ratio was transmuted into a 0-20 scale (0 to represent no interest, and 20 to represent the highest degree of interest).

This procedure was carried through for the three fields of interests characterized in the three samples, three "with" and three "without." In all, there were 10,880 reactions in each interest field for computation in developing the scoring keys upon the primary group. Each of the 10,880 reactions was allotted a score for intellectual interest, for social interest, and for activity interest. In the scoring of the papers of other

[1] The reliability of the teachers' estimates upon which these groupings were based, was tested as follows: The ratings of four teachers rating one group of 39 pupils were compared. The correlation coefficients follow:

Teacher	A	and	B	for	intellectual	interests	.507
"	A	"	C	"	"	"	.694
"	A	"	D	"	"	"	.273

The ratings of three teachers rating the same pupils on two occasions were compared for 39 pupils as follows:

Teacher	B's	two	ratings	on	intellectual	interests	.93 ± .04
"	C's	"	"	"	"	"	.77 ± .07
"	D's	"	"	"	"	"	.65 ± .08

groups by the scoring keys for intellectual, social, and activity interests, additional reactions were encountered, about 13,000, which were evaluated in the same way.

WYMAN'S SCORING KEYS FOR INTELLECTUAL, SOCIAL, AND ACTIVITY INTERESTS. Wyman's scoring keys for intellectual, social, and activity interests are formed of the interests of children judged to be primarily intellectual in their interests, or primarily social in their interests, or primarily interested in activities. Applying one of these scoring keys to the association-responses of a person will give a score in interests in relation to the group upon which the scoring key was based.

These scoring keys are very extensive, and have never been published. In Table XCIV are given the scores in the three fields of interest for the various responses to the stimulus-word "gem." There are similar keys for the 120 stimulus-words.

TABLE XCIV. SCORING KEYS FOR ASSOCIATION-RESPONSES TO STIMULUS-WORD "GEM," SHOWING SCORE CREDITS FOR INTELLECTUAL, SOCIAL, AND ACTIVITY INTERESTS [2]

Frequency	*Responses*	*I*	*S*	*A*
44	——	4	4	8
114	diamond	20	11	15
79	stone	12	10	15
57	jewel(s)	12	13	5
23	ruby	20	11	15
14	ring(s)	9	13	5
12	exercise(s)	3	9	12
12	precious	10	11	8
10	pearl	20	11	15
10	razor	3	9	6
6	boy	11	13	9
	basketball	8	9	12
	beautiful	10	11	8
	biscuits	3	9	12
	blade	3	9	6
	bread	3	9	12
	cake	3	9	12
	cast	8	9	6
	city	3	9	12
	Columbia	3	9	12
	Columbus	3	9	12
	cook	10	13	12
	country	3	9	12
	diamond ring	9	13	5
	doughnuts	3	9	12
	easy	10	11	8
	eat	10	13	12
	emerald	20	11	15
	events	8	6	7
	garnet	20	11	15
	gold	10	11	15

[2] The complete scoring keys for the 120 stimulus-words of Wyman's Free Association Test of Interests total approximately 120 typewritten pages. Information concerning these scoring keys can be secured from the author, Dr. Jennie Wyman Pilcher, University of British Columbia, Vancouver, Canada.

Frequency Responses	*I*	*S*	*A*	*Responses*	*I*	*S*	*A*
good	10	11	8	play	10	10	12
green	10	11	8	playground	3	13	12
gum	12	10	12	playroom	3	13	12
gun	10	10	7	precious stone	12	11	15
hard	10	11	8	present	7	13	5
Island of Gems	10	10	10	pretty	10	11	8
jelly	3	9	12	razor blade	3	9	6
jewelry	9	13	5	red	10	11	8
Jim	10	10	7	rich	10	11	8
juice	8	9	6	riches	8	7	5
light	3	9	6	round	10	11	8
meet	12	10	12	sapphire	20	11	15
memory	8	6	7	show	7	6	13
mine	9	7	5	sparkle	10	10	12
mineral	12	10	15	sparkling	10	11	8
money	8	7	5	sticks	10	10	10
muscle	11	9	12	thing	8	6	5
name	8	6	5	topaz	20	11	15
nursery	3	13	12	treasures	8	13	5
ocean	7	6	13	tree	8	9	6
pearl divers	20	11	9	valuable	10	11	8
physical aid	8	9	12	water	7	6	13
				wonderful	10	11	8

INDIVIDUAL DIFFERENCES IN THE FREE ASSOCIATION TEST OF INTERESTS. The classification of individuals as having intellectual, social, or activity interests is a qualitative division of people. But this division is based upon quantitative differences in these interests. The intellectually interested have more intellectual interests than the other groups. The socially interested are more so than the others. So with those primarily interested in activities. But all people have intellectual, social, and activity interests. The difference is one of greater numbers, or degrees, of interests in the special field of stimulation.

The question arises of how great are these individual differences between children in intellectual interests, in social interests, and in activity interests, as measured by Wyman's Free Association Test of Interests. They are not very great, as

shown by the averages for a group of 669 normal children and 629 gifted children[8] (*10*, 474-479) tested in 1923 by the Wyman Free Association Test of Interests. The average (mean) scores rise only 9 points for the normal boys and girls and 5 points for the gifted boys and girls between the ages of 10 and 14 years. This is for intellectual interests, where the total possible score is about 120 points. The rise is less for social and activity interests. Individual differences in interests between ages are not great, as shown in Table XCV.

Are there differences between individuals of the same age? The standard deviation, which is a measure including 34 per cent of the cases either side of the mean, shows that the distribution of the middle 68 per cent of the cases is within 20 points for normal boys and girls in intellectual interests; for gifted boys and girls it is within 14 points in intellectual interests; and for social and activity interests this distribution of scores is much less. These facts are illustrated in Table XCV, where standard deviations are given for the ages 10 and 14. There are practically no sex differences for either the normal or gifted children in these interests.

TABLE XCV. INDIVIDUAL DIFFERENCES IN WYMAN'S FREE ASSOCIATION INTEREST TEST (WYMAN)

		Intellectual Interests		*Social Interests*		*Activity Interests*	
		Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Age 10	Normal Boys	110.1	11.36	111.6	6.04	120.0	4.03
	Normal Girls	112.3	9.94	115.0	6.86	120.7	3.24
	Gifted Boys.	126.6	7.5	120.6	4.89	124.3	3.28
	Gifted Girls.	128.3	6.8	122.8	5.95	122.6	4.35
Age 14	Normal Boys	119.0	10.33	116.2	6.47	123.9	4.77
	Normal Girls	121.1	7.52	119.3	5.76	123.2	3.78
	Gifted Boys.	132.2	5.20	122.4	4.99	122.9	3.06
	Gifted Girls.	133.0	4.70	123.9	2.59	121.8	3.39

[8] The gifted children have an I.Q. of 140 or over. The normal children a composed of unselected or representative samples.

In a retesting of 91 of the gifted children five years later (1928) there was no change in the average scores, by ages, or for the total group. (*1*, 130)

Individual differences do not exist to any high degree in the specialized fields of interests to which the Wyman Free Association Interest Test has been applied. For this reason age norms and sex norms are of little practical value in the use of this test in guidance and selection. The main question, from the point of view of application, is whether or not the differences that do exist are great enough to distinguish groups of children according to their interests. The suggestion from the validation of the scoring key is that they are. But no method of evaluating the scores in intellectual, social, or activity interests, to show what are significant scores in these specialized interests, has been worked out. There are no critical scores indicating that a child belongs to the intellectual, or social, or activity group in interests, or to show when he is on the borderline in a field of specialized interests.

WYMAN'S VALIDATION OF THE SCORING KEYS OF SPECIALIZED INTERESTS. A validation of the scoring key is necessary to verify it as a measure of the same thing in other groups as in the primary sample. The problem is whether or not the same free association reactions exist in other groups as in the primary group. Are the free associations of the primary group discriminating reactions which contrast other "with" and "without" groups? This is the same problem as that faced in validating the scoring keys of the interest inventories.

Wyman began the validation of scoring keys with a preliminary test of 80 stimulus-words. The responses were scored for intellectual, social, and activity interests according to the author's judgment and correlations of scores with rankings by one teacher in intellectual, social, and activity interests were, in order, as follows: .67, .49, .22. (*10*, 458)

For the validation of the final scoring keys Wyman used six control groups of six and seventh grade pupils, a total of 206. Each subject was given the test and all the blanks were scored with the intellectual interest scoring key, the social interest scoring key, and the activity interest scoring key. The plan of

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dividing the control groups into "with" and "without" groups was much the same as with the primary group. The criteria were interest estimates of teachers,[4] which gave three classes of pupils, superior, average, and inferior in interests. In the validation of the scoring keys correlation coefficients were computed between each of the teacher's rankings and the test results for the different groups. Six coefficients for intellectual interests range from .39 to .70 with groups totaling 21 to 78. These correlations when corrected for attenuation range from .51 to .79. The coefficients with the same groups for social interests are somewhat lower and range from .25 to .57. Corrected for attenuation these correlations range from .34 to .68. The coefficients with the same groups for activity interests range from —.15 to .38 and corrected for attenuation from .31 to .70. The averages (means and medians) of these correlations are shown in Table XCVI.

TABLE XCVI. VALIDITY COEFFICIENTS OF FREE ASSOCIATION TEST OF INTERESTS (WYMAN)

	Average Raw Coefficient		*Average Corrected Coefficient*	
Interests	*Median*	*Mean*	*Median*	*Mean*
Intellectual Interests	.54	.53	.66	.65
Social Interests	.35	.36	.49	.50
Activity Interests	.20	.15	.43	.47

The correlations indicate a substantial relation with criteria, and as correlations run with such unreliable criteria as teachers' estimates, the suggestion is present that the free association test, scored with Wyman's scoring keys, is a fair indicator of

[4] Two teachers were asked to designate, for each group of pupils, 10 pupils with many and 10 pupils with few intellectual interests, social interests, and activity interests. To secure the reliability of these teachers' estimates of interests, the two teachers' rankings of each group were correlated together. Results are as follows:

	Groups of Pupils					
	I	II	III	IV	V	VI
Intellectual Interests	.62	.59	.77	.60	.52	.86
Social Interests	.37	.60	.71	.57	.59	.36
Activity Interests	.40	.29	.28	.36	.47	.50

The averages (means) of these correlation coefficients are: For intellectual interests .66 (median .61), for social interests .53 (median .58), and for activity interests .38 (median .28).

children's interest in the intellectual and social field. The validation is rough, however. The validation sample was small, as well as was the primary sample upon which the scoring keys were devised.

A further validation of the scoring keys was undertaken by Wyman with ability tests. (*10,* 479-481) Correlation coefficients, corrected for attenuation, between scores in the National Intelligence Test and the Stanford Achievement Test and scores in intellectual interests, social interests, and activity interests for 81 sixth and seventh grade pupils are shown in Table XCVII.

TABLE XCVII. CORRELATIONS BETWEEN SCORES IN FREE ASSOCIATION TEST AND MEASURES OF ABILITIES (WYMAN)

	National Intelligence Test	*Stanford Achievement Test*	*Stanford Achievement Test (National Intelligence Held Constant)*
Intellectual Interests	.46	.63	.49
Social Interests	.50	.50	.18
Activity Interests	.47	.38	.03

These correlations also indicate a substantial relationship between the interests and the measures of abilities, about the same as those found with criteria of interests. However, the correlations in the third column, which are partial correlations and eliminate the influence of intelligence (as measured by the N.I.T.) from the correlation between the three interest scores and achievement, suggest that the relationship is greater with achievement for the intellectual interests than with intelligence. As the Stanford Achievement Test measures intellectual achievement and not social or activity achievement the relationship may be one of the influence of interests upon achievement.

Wyman discusses this question of the causal relation in school achievement between intelligence and intellectual interests. Is it necessary that a child be interested to achieve intellectual success? Does ability engender interest? In answer to these questions Wyman says:

> We find that the most successful child is highly intelligent and highly interested. Some children who are not highly interested have

succeeded, but they are highly intelligent. Again, some highly intelligent, but not highly interested, have not succeeded; and, finally, some with lower intelligence and not a high degree of success are highly interested. The answer to the question, then, is that a child must be interested to achieve success, the greater the interest and the higher the intelligence, the greater the success—and not that ability to succeed produces the interest. (*10*, 480)

PERMANENCE AS A TEST OF VALIDITY. Subjective interests, feelings of like and dislike, were found to be lacking in any high degree of permanence. If objective interests, interests measured by tests of the human reaction, are the same thing as subjective interests, they too would not be expected to have a high degree of permanence. The degree of permanence of objective interests, then, would appear to be an indicator of the validity of the test as a measure of interests. If the test shows that interests are permanent in the individual, then the test is not a measure of interests or feeling, but more probably a test of abilities. If, on the other hand, the scores in the test lack permanence, the measure may be one of interests.

None of the information tests applied to the measurement of interests have been given this trial. But in a preliminary experiment with the free association test Wyman (*10*, 457-461) gave 47 of the same stimulus-words on two occasions, separated by 13 months, to 53 children of the sixth and seventh grades. The responses to the test on the two occasions were classified into 14 categories of response, which were arranged according to commonness of some important factor in the reactions. A coefficient of mean square contingency was computed for the two occasions of .80. These results suggest a fairly high degree of permanence for the Free Association Test of Interests.

A more significant trial of the permanence of this test has been made with ninety-one gifted children, who were retested in 1928, five years after the original testing in 1923. (*1*, 131) In 1923 these children ranged from ages 9 to 14 years. The test blanks of both occasions were scored with Wyman's scoring keys for intellectual interests, for social interests, and for activity interests. Correlation coefficients for these 91 children

between their interests scores in 1923 and 1928 are shown in Table XCVIII.

TABLE XCVIII. RELATION BETWEEN INTEREST SCORES IN 1923 AND IN 1928 FOR 91 GIFTED CHILDREN IN THE WYMAN FREE ASSOCIATION TEST OF INTERESTS (TERMAN)

Fields of Interests	*Correlation Coefficient*
Intellectual Interests	.31 ± .06
Social Interests	.37 ± .06
Activity Interests	.15 ± .07

All of these correlations show a low relationship. They compare favorably with the correlations secured in the measures of permanence of subjective interests. The indication is that there is a low degree of permanence for objective interests measured by the Free Association Test of Interests and there is the indirect suggestion that the method offers a valid measurement of interests.

THE INTERCORRELATION OF THE SCORING KEYS OF INTELLECTUAL, SOCIAL, AND ACTIVITY INTERESTS. It would be interesting to know if these scoring keys of specialized interests are, in reality, different measures, or measures of the same thing. Wyman has given us information upon this question. Correlations were computed (*10,* 458), using the preliminary list of 80 stimulus-words and scoring according to the author's judgment, for two groups of 51 and 31 children. Between intellectual and social interests the correlations are .36 and .56, between intellectual and activity, .20 and .10, and between social and activity interests —.08 and .21. The correlations between the intellectual and social interests are the only ones showing a substantial relationship.

Intercorrelations are also reported (*10,* 468) between the intellectual, social, and activity scoring keys used with the final list of 120 stimulus-words. (Table XCIX.) It is seen that these correlations are somewhat higher. Those between intellectual and social interests show a very substantial relationship, while those between the other scoring keys are fairly low. Intercorrelations, corrected for attenuation, are also reported between scores for the three kinds of interests for 81 sixth grade

children. (*10*, 479) Between intellectual and social interests the coefficient is .80, which is a high relationship. Between intellectual and activity interests the coefficient is .58, and between social and activity interests .51. These are substantial relationships. But when the influence of intellectual interests is partialed out of the correlation between social and activity interests this correlation is reduced to .10, indicating a negligible relationship. With the influence of social interests partialed out of the relation between intellectual and activity interests the correlation is reduced to .33. These facts, in themselves, suggest a close relationship between intellectual and social interests. When activity interests are partialed out of the relation between intellectual and social interests the correlation remains at .72. Evidently the keys for intellectual and social interests are scoring much the same thing. The correlations between these scoring keys are nearly as high as their reliability coefficients. But activity interests seem to be distinct from intellectual and social interests. These are the interests in which gifted and average children are found to be much the same at most ages, while in social and intellectual interests there are wide differences between the gifted and the average children.

TABLE XCIX. INTERCORRELATIONS OF SCORING KEYS OF INTELLECTUAL, SOCIAL, AND ACTIVITY INTERESTS (WYMAN)

	12-Year-Old Girls	*12-Year-Old Boys*
Intellectual *vs.* Social Interests	.68	.80
Intellectual *vs.* Activity Interests ...	.29	.35
Social *vs.* Activity Interests	.32	.53

RELIABILITY OF WYMAN'S TEST. In the preliminary experiment, using the list of 80 stimulus-words, Wyman tested the reliability of the scoring keys, which were made according to the author's judgment (*10*, 458), and found high reliability coefficients for the intellectual interest scoring key of .85 and .89 for the two groups of 51 and 39 children. The reliability coefficients of these groups for the social interest scoring key were .66 and .66 and for the activity interest scoring key .48

and .45. Reliability coefficients for the final scoring keys are reported in Table C. (*10*, 468)

TABLE C. RELIABILITY COEFFICIENTS FOR SCORING KEYS OF INTELLECTUAL, SOCIAL, AND ACTIVITY INTERESTS (WYMAN)

	12-Year-Old Girls	*12-Year-Old Boys*
Intellectual Interests	.87	.83
Social Interests	.82	.87
Activity Interests	.48	.87

These coefficients, with the exception of one, compare favorably with reliability coefficients secured in the use of ability tests. Reliability coefficients were also computed (*10*, 479) for the group of 81 sixth and seventh grade children. For intellectual interests the correlation was .94; for social interests it was .83; and for activity interests .86. The Free Association Test of Interests thus appears to possess a fairly high reliability.

SUMMARY OF FACTS CONCERNING THE FREE ASSOCIATION TEST OF INTERESTS. A summary of the facts from the very thoroughgoing trial of the Free Association Test, applied to the measurement of interests by Wyman, (*10*, 455-483, *11*) follows:

1. A Free Association Interest Test of 120 stimulus-words, balanced equally to stimulate free associations by the discrete method in three fields of intellectual, social, and activity interests, has been developed by Wyman for use with school children within the ages of eight to fifteen years.

2. Scoring keys have been made for three fields of interests: intellectual interests, social interests, activity interests. The method of scoring responses to the stimulus-words has followed closely the Ream-Cowdery-Strong plan of distinguishing interest groups from non-groups. Frequency tables of responses have been developed similar to those of Kent-Rosanoff. The reactions have been scored for specialized fields of interests from 0 to 20 according to the frequency of these reactions from children known to be primarily interested in these specialized fields.

3. Individual differences in specialized interests, meas-

ured by Wyman's Free Association Test of Interests, are not great, but are possibly sufficient for purposes of qualitative classification of individuals into specialized fields of interests, as is the plan of scoring. No critical scores for separating individuals according to specialized or non-specialized interests, which are dependent upon these individual differences, have been developed.

4. The division of individuals by the Free Association Test of Interests, according to Wyman's plan of scoring, is a division of those "with" and those "without" certain interests. This division, theoretically, has a certain chance basis of selection and if the two groups are even there is a 50-50 guessing basis. The improvement of the guessing basis is indicated in the validation of the scoring key by correlation coefficients, corrected for attenuation, of .65 (mean) for intellectual interests, of .50 (mean) for social interests, and of .47 (mean) for activity interests. The criterion upon which the scoring key was devised, and upon which it was validated, that is, teachers' estimates of dominant interests in pupils, is always a questionable basis for validation, although it may be difficult to find any criteria more satisfactory. The test may be much better or far worse than is indicated.

5. In a further validation with intelligence and achievement tests the correlation coefficients show an equally good relationship with these criteria of abilities as with the criterion of interests. There is an average correlation of .49 (mean) with teachers' estimates of interests; an average of .48 (mean) with the National Intelligence Test; and an average of .50 (mean) with the Stanford Achievement Test. When the partial correlation technique is used, intellectual interests are shown to be more closely related to achievement than to intelligence, which may be the influence of interests upon achievement.

6. Permanence as a validity criterion for Wyman's Free Association Test of Interests offers an argument for the test as a measure of interests. Subjective interests lack a high degree of permanence. The average correlation for the three fields of specialized interests over a period of five

years is .28 (mean), which is a relation similar to that found among subjective interests.

7. The intercorrelations of the scoring keys of intellectual, social, and activity interests indicate that the keys of intellectual and social interests are scoring for much the same thing, while the key of activity interests scores different interests.

8. The reliability of Wyman's scoring keys of intellectual, social, and activity interests, which is represented by coefficients between .80 and .90, is as high as that recognized as necessary for tests of abilities.

9. The Wyman Free Association Test of Interests would seem to be a useful test in the measurement of interests for the guidance of children. It needs further development. But the method of measurement is distinctly promising and the test has been successfully applied by Wyman to the measurement of differences between gifted and normal children.

The development of the free association method in the measurement of interests has gone farther than any other objective method. But the work involved in developing scoring keys according to the plan of scoring is tremendous. It is possible that frequency tables for specialized groups, e.g., social and occupational groups, might give more accurate discriminations. Specialized word stimuli for different activity fields is another line of attack similar to the specialized information test. Reviewing the facts of validation of this measurement of interests, there is encouragement that the factors of ability can be eliminated and a true objective measurement of interests be made. To date, the free association test offers the most promising objective method of interest measurement. Further investigations of this kind will undoubtedly follow.

A Word Association Learning Test as a Measure of Interests. There is a traditional theory that we learn better with pleasant feeling or interest and worse with unpleasant feeling or aversion. This theory has been used as the basis for a test of strength of interests by Burtt. In 1922 he invented a test for specialized interests in a field, such as medicine, by

a comparison of the accuracy of the learning associations of ordinary or general words and of words in the specialized interest field. He tried out this idea with forty-three agricultural engineers. (*2, 3*) To the person being tested he read pairs of words so that they might be associated together. After this, the list of stimulus-words was repeated and the individual was asked to add to the first words of the pair, as they were read to him, the words associated with them. The stimulus-words used by Burtt were of two kinds: (1) a normal stimulus of general, or ordinary, association words, and (2) a stimulus of words in the field of agricultural engineering. For instance, the word "stamp" was to be associated with the word "letter," and the word "equation" with the word "formula." The first is a general association and the second is an association in the field of engineering. Again, the word "eager" was to be associated with the word "task" and the word "hydrometer" with the word "liquid," representing a general and a specialized association. There are 108 such word associations in the test, which alternates general and specialized association word-stimuli.[5]

The assumption was made by Burtt that students interested in agricultural engineering would more readily associate pairs of words related to that vocation because of the pleasant feeling aroused in those associations. The measure of interests is a comparison of learning, or memory, for specialized material with learning, or memory, for general material. The score in the test is the ratio of the number of agricultural engineering associations to the normal associations. Thus Burtt got rid of the influence of differences between individuals in learning capacity or intelligence.

The correlation coefficient between the scores of the forty-three agricultural engineers and interest in agricultural engineering as estimated by instructors was .30. With ability as estimated by instructors it was .43. When the influence of ability was partialed out from the correlation between the test and the interest estimates the correlation was reduced to .05. On the other hand, when the influence of interest was

[5] Burtt's Word Association Learning Test of Interests is on file in the Department of Psychology, New York University.

partialed out from the correlation between the test and ability the correlation was .33.

CRITICISM OF LEARNING TESTS OF INTERESTS. The theory upon which this test is based has never received experimental support, although it has been given repeated trial in the field of education. Burtt concludes that the test is more a test of ability. The correlations imply this conclusion. It is doubtful that a test of interests can be founded upon learning. The general trend of experimentation is against any such testing basis of interests.

A DISTRACTION TEST OF INTERESTS. It is theoretically conceivable that a person is less likely to be distracted, that is, his attention is better, when he is interested. Burtt (*2, 3*) experimented with this idea in the measurement of strength of interests. Two selections of prose, one a normal or standard stimulus and the other an interest stimulus, were given to the forty-three college students specializing in agricultural engineering. The instructions were to cross out the irrelevant words "as fast as you can without mistakes." The score, which is the inverse ratio of number of irrelevant words crossed out in the interest stimulus to the number of words crossed out in the normal stimulus, correlates with interest in agricultural engineering, as estimated by instructors, .30. With ability in agricultural engineering, as estimated by instructors, it correlates .20. With the influence of ability partialed out, the correlation is .23. With the influence of interest partialed out, the correlation with ability is reduced to .02.

A form of this test, illustrating the general interest reading and the specialized interest reading, is reproduced below by courtesy of H. E. Burtt.

BURTT'S DISTRACTION TEST OF INTERESTS

General Interest Reading. Nothing amounts bud to much in this but world can but achievement. Nothing gives con lasting satisfaction dab except din work that accomplishes something. Happiness dip comes dim from had work,—not because dot of the money fig it brings bix but because of the inner fob satisfaction fop we get out gin of it. Let a man know gun something gob thoroughly and hot be able to talk it well. Let gut him have hat gained interesting information hit whether

from hut reading or ham travel or a good habit hag of constant inquiry hip among his hid fellow men,—that jam man will have hod the key that opens jib all kinds of doors. He jet will find himself let a welcome lit member of any group lap of thoughtful lot men. Facts are demoncratic. They are lad equally at home mud in the brain mut of the college-bred men net or the man nip who has worked pot with his hands from his pit youth up. And the put man who has pun the facts rib and can develop rat them with rot greatest effectiveness and charm row carries with him run the assurance ran of his own rod welcome and rob success. Make it rim a rule to spend some time sat every day with sob someone who knows sup more than you do. A live say men if you sad can find son him; or a man of a tub former generation tip speaking through tin a great book. No man tan grows except as ton he reaches war up. Don't spend won your life with yes those who wit know less than you do yew or only as much are. Expose yourself why regularly to the way inspiration and dog education of lay bigger more mature minds.

Specialized Interest Reading. There are doe two groups of persons in fan the educational fin world who are fun directly interested fib in the application of bib statistical but methods to school bud problems,—the can administrator the din teacher and dim the psychologist. Corresponding dot to these two fig classes of fox interest school problems fop may be said fob to be gin either administrative or pedagogical gun in character. They gob arise get either in connection with gut the attempt hot of the hat administrative agents hit of a school system hut to fit the ham machinery of the system hum to the needs him of the hag children or to the attempt hip to determine more hid exactly the hod status of learning jam in the child. The school jib man's chief jet concern is with joy these questions: first, lit how does let the child learn; lob second, how lab may the course lid of study and methods of lad teaching be best lot adapted to man the established facts of mit development men and processes met of learning in children and to mat the needs mob of their mut future life. The method of nut attacking mud such questions nip prior to our own pet generation was pat clearly pit traditional and based put on individual pun experience. It rib was freely said by rat the representatives rot of other run sciences and admitted by rug teachers that sat education was sob not a science and sup that its methods son were not sud scientific. This meant that sun school men tub did not use tip the fundamental steps tin in the scientific tan procedure of war solving problems.

Another form "to locate persons who are ambitious and particularly interested in success and achievement" is also described by Burtt. (*4*, 305 f.) The theory behind this method of testing interests is that the individual most interested in the specialized selection will be more likely to overlook the

irrelevant words, that he will be more inhibited in his response to irrelevant material. Theoretically, the individual who reacts the least to the irrelevant material is the most interested in the field of the reading. The normal stimulus was added to remove individual differences due to other factors than interests.

CRITICISM OF DISTRACTION TESTS OF INTERESTS. Burtt's conclusion is that the distraction materials method is a promising method of measurement of interests. The correlations imply that there is being measured here more of what the instructors regard as interest than of what they regard as ability. On the other hand, it would seem that the test is chiefly a test of motivation. The concentration measured would seem to be due to drive in the special field of activity rather than to pleasant feeling in this special field. The instructors were asked to rate the students upon their industriousness and interest in agricultural engineering, which would be a partial rating of motivation. These are theoretical questions, however, and there would seem to be real value in the distraction method developed by Burtt as a measure of something different from abilities.

BURTT'S CONTRIBUTION TO THE MEASUREMENT OF INTERESTS. It would seem to be a valid assumption that the human reaction embodies all factors of personality. Ability measures have been conceived as total measures of the human reaction. We are now face to face with the problem of dividing up the human reaction to secure a measure of interests. Recognizing this, Burtt has eliminated the ability factor in the measurement of the reaction by a method which is old in experimental psychology, but which has never before been applied to the measurement of interests. In his learning test and in his distraction test, by giving a general test, he aims to eliminate the ability factor. In the learning test the general stimulus would measure individual ability differences. These are subtracted from the differences in the learning of the special stimulus, thus supposedly leaving the effect of interests on learning for measurement. In the distraction test Burtt attempts in the same manner to eliminate the differences in ability. He has added a valuable technique to the measurement of interests which should be of assistance to future investigators.

OTHER MEASURES OF OBJECTIVE INTERESTS. Various objective measures have been devised for the estimation of interests in specialized fields. Some of these have already been discussed. Kelley's (*6*) interest questionnaire (Chapter II, pp. 42-6) included a list of 70 magazines to be checked by subjects who had not looked through two or more copies of the magazine. This is a measure of objectively verifiable information, but the factor of honesty is uncontrolled. Kelley's questionnaire also included a vocabulary test in which the subject was asked to rate in degrees his definition of the words in a list of 62. This test also depended upon honesty. But Kelley asked the subject actually to define 13 of these words, in another part of the questionnaire, and a ratio, called the "factor of accuracy," was determined for each subject, thus making the test, by the use of the sampling method, an accurate objective measure.

The collections of children have been made the subject of investigation as an indication of interests by Terman. (*10*, 379-382) Both reports of children and of parents have been used.[6] Terman finds fair agreement between parents' and children's reports, although boys tended to report a good many collections which the parents probably knew nothing about. The collections made by 643 gifted children and 527 normal children are shown in Table CI. The figures are the average number per individual for age and sex.

TABLE CI. NUMBER OF COLLECTIONS MADE BY CHILDREN (TERMAN)

Age	*Sex*	*Normal Children*	*Gifted Children*
6	Girls	.00	1.00
	Boys	.00	1.00
7	Girls	.00	.06
	Boys	.00	.75
8	Girls	.88	1.17
	Boys	.48	1.42

[6] The children were asked "to name all of the collections you have made; tell how old you were when you made the collection and tell how large it was." Parents were asked "to name the collections the children had made, to indicate from what age to what age it was in progress; and to state whether it was large, medium, or small."

Age	*Sex*	*Normal Children*	*Gifted Children*
9	Girls	.97	1.44
	Boys	.38	1.81
10	Girls	.70	1.40
	Boys	.50	1.63
11	Girls	.80	1.93
	Boys	1.15	1.68
12	Girls	1.54	1.77
	Boys	1.28	1.90
13	Girls	.74	1.13
	Boys	1.30	2.00

There are age differences as shown in the table. This measure of children's collections should be usable as a criterion of interests for the validation of tests of interests.

Another test of objective interests devised by Terman and his co-workers in the study of genius (*10*, 441-454) is one of amount of reading. Each child was asked to keep a record over a period of two months of all books read (other than school texts) in a specially prepared notebook.[7] Records were secured from 808 normal children and 511 gifted children, which are shown in Table CII. In this way, Terman secured an objective measure for comparative purposes of the reading interests of children.

There are age differences, sex differences, and differences between the normal and gifted groups in amount of reading. At all ages, for both normal and gifted children, girls read more than boys. The age differences are not as significant as the sex and mental level differences. This measure of interests should also be usable as a criterion upon which to validate tests of interests.

THE INVESTIGATION OF PLAY INTERESTS. The investigations in this field, which were the earliest in the study of inter-

[7] The method of keeping the record is described by Terman. (*10*, 444 f.) The amount of reading of the children was also estimated by parents and by the teachers. The parents were asked to indicate the kind and the amount, in terms of hours per week, of *home reading* at various ages. The teachers were asked to answer the following question: "As compared with the average child of the same age, does this child read (1) very much, (2) more than average, (3) average amount, (4) less than average, (5) very little?" Terman considers that the factual records secured from the children furnish the most reliable evidence of the reading interests of children.

ests, are largely from the point of view of quantitative study in the understanding of childhood. A survey of play literature will be found elsewhere (*7*). Our interest is in the adjustment of the individual in the development of a normal play life.

TABLE CII. AVERAGE NUMBER OF BOOKS READ IN TWO MONTHS BY CHILDREN (TERMAN)

Age	*Sex*	*Normal Children*	*Gifted Children*
6-7	Girls	0.0	11.5
	Boys	0.0	9.3
8-9	Girls	5.6	15.2
	Boys	4.6	12.4
10-11	Girls	8.7	15.6
	Boys	7.3	14.7
12-13	Girls	7.7	16.5
	Boys	5.8	12.8
14-15	Girls	9.3	...
	Boys	7.5	...

The investigation of play interests began at the turning of the century with the use of the questionnaire method (*5, 9*) in an attempt to secure from the child himself information concerning his play life. Such questions as the following were asked in the early questionnaires given out to children:

What toys or playthings do you use most (a) in winter, (b) in spring, (c) in summer, (d) in fall?

A printed list of amusements was introduced early. (*8*) Children were also asked to check their favorite games upon an extensive list of play activities, but the study of subjective interests by means of the inventory has been fairly limited in the field of play because of the evident invalidity of the children's estimates. Early investigators confined themselves quite largely to surveying the activities performed by children, usually by questionnaire methods. Lehman and Witty mention five methods used in the study of play interests (*7, 27*): the questionnaire method, the list of activities for checking games liked or disliked or for checking games played, results

of personal observation of investigators, assembling the opinions of play experts and the recreational survey of facilities. The information test is a sixth method.

Terman and his assistants have used several of these methods in the study of the play interests of normal and gifted children, ages 10 to 16. (*10,* 385-439) In a four-page folder of "Plays, Games, and Amusements," used by them, there are listed ninety activities, such as "Roll hoops, Play jackstones, Spin tops," classified into groups as follows: active-quiet games, social-active games, and active-solitary games. In its use this list was repeated three times, and estimates, first of play knowledge, second of play likes and third of play practice were secured. (*10,* 388-9)

These are three criteria of interests, it would seem. The first and third investigate objective interests with no check upon honesty. The last two were combined by Terman into a single score in an analysis of the results, and the estimates of play knowledge were disregarded because of inaccuracies. In the scoring method a *preference index* (*10,* 393-407) was developed for each of the 90 games, separately by age, by sex, and by group (gifted or normal), by means of which various group comparisons of interests were made.[8]

A Yes-No test of play experience was included with those above.[9] (*10,* 389) This test, like two of those mentioned, is a measure of objective interests, but with the factor of honesty uncontrolled. Forty-five items are included, some of which follow:

[8] Several group comparisons of play interests were worked out in this study including a *masculinity index* (*10,* 407-413) and a *maturity index.* (*10,* 413-425)

[9] In this connection there should be mentioned an inventory of "Various Types of Activities" which was used by Terman and his co-workers in these studies of play interests. (*10,* 377-379) The child was asked to rate his liking of each of 12 general activities, such as, "going to parties, picnics, dances, club meetings, etc.," to show how well he liked to do the thing. The ratings for each activity were averaged and the results used for group comparisons, as follows:

Activity	*Boys*		*Girls*	
	Gifted	*Control*	*Gifted*	*Control*
Tools, apparatus or machinery	1.81	1.89	2.96	3.47

In general the gifted children were found to rate the activities higher than did the control group. They seemed to secure greater pleasure in activity than the normal children.

1. Did you ever catch a fish?.....Yes No
7. Did you ever make a water-wheel?.....Yes No
16. Can you walk on your hands?.....Yes No
24. Can you read the time from the sundial?..Yes No
41. Do you belong to a track team?.....Yes No

The test of Play Experience was used in the study of 554 gifted children and 474 normal children. (*10*, 425-9) The individual differences, in the number of things done by these children, are shown in Table CIII.

TABLE CIII. THINGS DONE BY CHILDREN AS AN INDICATOR OF INTERESTS (TERMAN)

Age	*Normal Boys*	*Gifted Boys*	*Normal Girls*	*Gifted Girls*
6-7	....	6.8	....	8.1
8	11.0	12.0	9.6	6.1
9	15.0	12.8	8.9	8.7
10	15.1	15.6	11.8	9.9
11	17.6	15.3	11.2	10.2
12	15.6	16.8	12.8	12.9
13	19.9	20.2	10.8	10.9
14	19.0	....	12.0	....
15-17	18.2	....	11.0	....

TERMAN'S INFORMATION TEST OF PLAY INTERESTS. There is but one test of objective play interests which controls the factor of honesty. This is an information test (already mentioned in Chapter VIII, p. 275), which was used by Terman as part of the investigation of the play interests of gifted children. (*10*, 390-3) The test is of the multiple choice variety, and is a sampling of children's games and amusements, including 123 items. Nineteen are questions related to solitary-active games, 82 to social-active games, and 22 to semi-social, quiet games. One from each of these series follows:

Series 1: You pick up jackstraws with a *Magnet Hook Fingers.*
Series 2: A game where you look for something hidden is *I-spy Old Witch Roly-Poly.*
Series 3: "Hearts" is played with *Cards Dice Dominoes.*

Terman's Information Test of Play Interests has been administered to groups of 20 to 50, and sufficient time was allowed

to complete the test. The test is arranged for children above the third school grade. The items of information in the test relate to the list of play activities mentioned above, which offers the possibility of comparison of subjective and objective measures of interests in the same field of activities. The score in the information test is taken as the number of correct responses minus one-half the number of wrong responses (R — ½W).

Five hundred gifted children and 474 normal children have been tested with Terman's Information Test of Play Interests. Wide individual differences are shown for age and sex among both gifted and normal groups. These differences are illustrated in the age and sex norms for the test, shown in Table CIV.

TABLE CIV. NORMS FOR TERMAN'S INFORMATION TEST OF PLAY INTERESTS (TERMAN)

Norms for Boys

	225 Normal Boys		*303 Gifted Boys*	
Age	*Mean Score*	*S.D.*	*Mean Score*	*S.D.*
6-7	....	....	15.3	11.2
8	14.8	5.8	32.5	15.0
9	17.8	11.7	49.8	15.5
10	27.7	15.6	58.0	15.3
11	35.6	21.3	70.1	13.5
12	46.1	19.3	77.3	11.7
13	50.0	26.9	83.7	8.0
14	50.7	23.7	....	....
15-17	32.4	24.8	....	....

Norms for Girls

	249 Normal Girls		*251 Gifted Girls*	
Age	*Mean Score*	*S.D.*	*Mean Score*	*S.D.*
6-7	....	....	15.6	8.5
8	8.0	4.4	23.6	11.4
9	13.3	9.5	33.1	14.6
10	18.3	9.1	44.3	15.4
11	31.3	15.4	53.5	15.1
12	33.8	16.4	62.6	12.5
13	49.1	18.7	71.7	12.0
14	42.9	19.8	....	....
15-17	38.3	14.3	....	....

An interest quotient was devised in the use of this test. The age averages (means) of the control boys and girls were smoothed and used as norms for the calculation of interest quotients by using the individual scores as numerators in the fraction. The mean quotient of the gifted boys is 139, and of the gifted girls 134, which indicates the enormous superiority of the gifted children in this test of objective interests.

It will be noted that there is progressive development in information of play activities up to the age of 13 for both normal and gifted boys and girls. There is suggested a decrease in knowledge for the normal children after this age. This was also suggested by the Yes-No questionnaire of play experience given these same children.

'LEHMAN'S PLAY QUIZ."[10] "Lehman's Play Quiz" for grades three or above is a measure of objective play interests with the factor of honesty uncontrolled. It is the most extensive test of play interests in use, including 200 items. Directions are as follows:

> What things have you been doing during the past week just because you wanted to?
>
> Read through the following list of toys and games and other things, and as you read through the list, draw a circle with your pencil around each number that stands in front of anything that you have played *during the past week,* or anything that you have done *during the past week* just because you wanted to do it.

Then follows a list of 200 games and amusements, such as:

2. Basket-ball	76. Camping out	163. London Bridge
16. Dominoes	102. Hide the thimble	172. Clay modelling
39. Gathering nuts	150. Playing cowboy	194. Picture puzzles

At the 125th item there is indicated a break for a second sitting when the test is used with third and fourth grade children. In the use of the quiz with these grades the teacher is instructed to read aloud the list of activities to insure comprehension. The score in the Play Quiz is the number of items circled, that is, the number of games played by the children. In the general administration of the Play Quiz it has been found

[10] "Lehman's Play Quiz" (*7,* 37-41) is published for general use and is distributed by Harvey C. Lehman, Ohio University, Athens, Ohio.

advisable to have the same children check the items on three occasions, at different periods of the year, in order to include all the seasonal interests. Lehman and Witty (7) administered the quiz during the months of November, February and April in their studies of subjects of all ages. Used in this manner they believe that the analysis of results should be a valuable aid in the adjustment of the individual.

NORMS FOR LEHMAN'S PLAY QUIZ. Preliminary investigations in the use of Lehman's Play Quiz were begun in 1923. The first list of play activities was composed of 140 items, which was prepared for use with ages 5 to 22. Some of the items were secured from early studies. (5, 8) Other items were secured from the miscellaneous additions made by the children on the first forms. Items were omitted when they were checked by all but two or three per cent. The Play Quiz has been extensively used by the authors in studies of 2,399 city boys and 2,655 city girls in 1923-24, 433 rural boys and 387 rural girls in 1925 and 6,886 city boys and girls in 1926. Scores for these boys and girls from 8 to 22 years, showing average (median) scores and range of the middle fifty per cent of the scores for each age, are published by the authors (7, 59) and can be used as age norms in connection with Lehman's Play Quiz. These age scores show a negative progression of numbers of play activities engaged in throughout the years, as is indicated in Table CV where the average (median) scores in the Play Quiz are given for ages 8, 12, 16, and 20.

TABLE CV. SCORES BY AGES FOR BOYS AND GIRLS IN LEHMAN'S PLAY QUIZ (LEHMAN AND WITTY)

Age	*Average Score for Boys*	*Average Score for Girls*
8	40.11	34.44
12	31.40	28.32
16	20.40	19.77
20	18.40	18.59

In all cases the range of the middle fifty per cent of the scores of boys and girls for a certain age overlaps the average scores of the age above or below. For the eighth year the range of the middle fifty per cent is from 27 to 54 for the boys and

22 to 49 for the girls. For the twelfth year it is 22 to 43 and 21 to 41 respectively; for the sixteenth year it is 15 to 28 and 14 to 25 and for the twentieth year 13 to 24 and 14 to 24. The wide distribution of scores for each age indicates that the average scores are of doubtful value as norms of play adjustment, although they may be considered as suggestive of the variety of games engaged in by normal children.

INVESTIGATION OF PLAY INTERESTS WITH THE PLAY QUIZ. In Table CVI is a list of the play activities engaged in by more than twenty-five per cent of the boys and girls, aged eight and a half to twenty-two inclusive, as studied by Lehman and Witty (7).

TABLE CVI. PLAY ACTIVITIES ENGAGED IN BY MORE THAN TWENTY-FIVE PER CENT OF BOYS AND GIRLS OF AGES 8½ TO 22 INCLUSIVE

Boys	*Girls*
Baseball with a hard ball	Listening to the victrola
Just playing catch	Playing the piano for fun
Riding in an auto	Riding in an auto
Watching athletic sports	Writing letters
Going to the movies	Reading short stories
Chewing gum	Reading the newspapers
Card games, such as authors, bridge, whist	Reading jokes or funny sayings
Listening to the victrola	Going to the movies
Listening to the radio	Looking at the Sunday "funny" paper
Looking at the Sunday "funny" paper	Going to parties or picnics
Reading jokes or funny sayings	Visiting or entertaining company
Reading the newspapers	Chewing gum
Reading short stories	Teasing somebody
Reading books	Listening to stories
Writing letters	Gathering flowers
Whistling	Just singing
Teasing somebody	Looking at pictures

No activity is engaged in by all individuals of the same age level. In most instances less than fifty per cent of the children of a given age participated in a given activity. The younger subjects engage in a larger number of activities and also manifest a greater variability in activities than do the older. The median number of activities for boys falls regularly from 40

for the age of eight to 18 at the age of twenty-two; for girls it declines from 34 at eight years to 17 at twenty-two. Lehman and Witty think that at no age can the play activities be designated as social or individualistic and there are no ages at which diversity of play interests suddenly increase or decrease by spurts. Various sex differences have been indicated by the use of the Play Quiz.

PLAY INTEREST TESTS. Play interests have been made the subject of extensive investigation over the longest period of any development in the field of interest measurement. In spite of this there are few measuring devices, inventories or tests, which are applicable in the adjustment of the individual. The use of Lehman's Play Quiz should be suggestive for this purpose. Also, Terman's Information Test of Play Interests would seem to be of experimental value.

The age norms of Terman's Test of Play Experience (Table CIII) and Terman's Information Test of Play Interests (Table CIV) are in general agreement. That is, they indicate a positive progression in participation in games from the early ages to about thirteen years. This is evidence contrary to the results with Lehman's quiz (Table CV), where the number of activities decrease as the child matures. Lehman's Play Quiz would seem to be a similar measure to the Test of Play Experience and the Information Test, but evidently there are differences in the measures which have influenced the results.

AN INVESTIGATION OF NORMAL AND GIFTED CHILDREN BY OBJECTIVE TESTS OF INTERESTS. The purpose behind the development of the objective tests of interests by Terman and his co-workers was a comparative study of normal and gifted children. Normal children were considered to be those unselected or representing a normal distribution. Gifted children were in the main those with a Stanford-Binet intelligence quotient of 140 or over.

The gifted group, selected by the Stanford-Binet examination, is found to be superior in practically all objective measures of interests. With the information test of interests used by Terman there was a decided superiority of the gifted children for all ages and both sexes over the normal children. Gifted girls are 34 per cent superior to normal girls and gifted

interests about 90 per cent of the gifted children equal or exceed the average (mean) of the normal children. About 85 per cent of the gifted children equal or exceed the average (mean) in social interests. In activity interests the two groups are about the same after the twelfth year. These differences are shown in the figure (Figure 14).

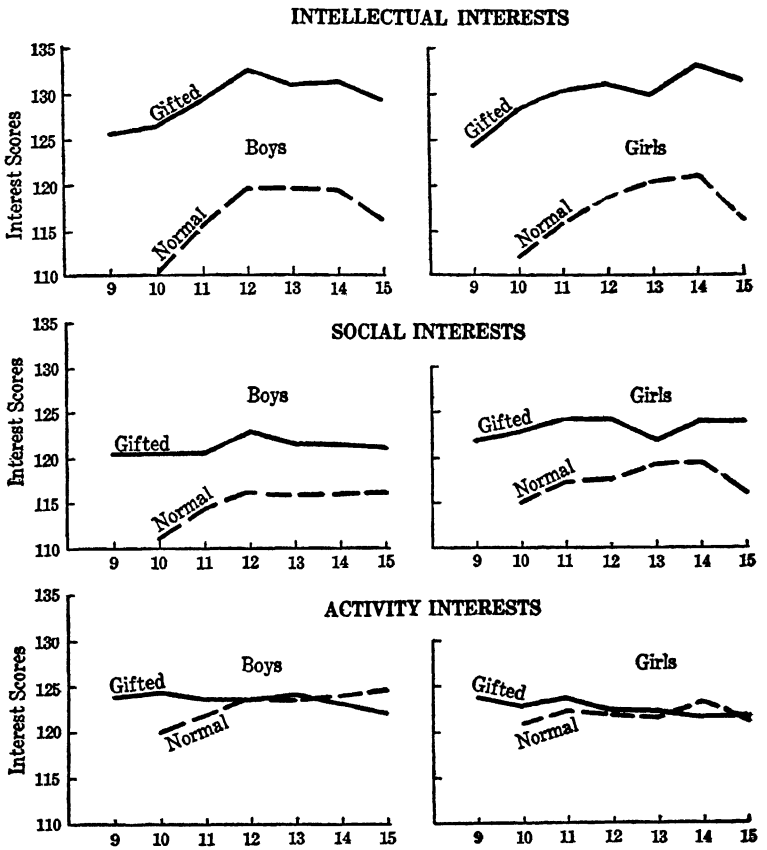

Figure 14. Average (mean) scores in Wyman's Free Association Test of Interests by age, showing relation between gifted and normal children in intellectual, social, and activity interests (after Wyman).

THE RELATION OF OBJECTIVE INTERESTS TO ABILITIES. The argument might be advanced from this that the superiority of the gifted over the normal in these objective tests of interests

is indicative of a high relationship between abilities and interests. In this argument the assumption is made that the objective measures used are measures of interests and not of abilities. The establishment of objective measures of interests has only begun, although there has been encouraging progress. If there was a high correlation between tests of interests and tests of abilities, the tests of interests would be tests of abilities, or *vice versa,* according to the way one wished to call them. If interest and ability traits are highly correlated they are the same thing, and they could be called by either name. That they are not the same is evident, and the search is for tests that are not measures of abilities and may be measures of interests.

But this does not mean that all traits of personality are unrelated. The *Genetic Studies of Genius* (10), referred to above, clearly demonstrates the contrary. It is a general conclusion of psychological measurement that all objective tests of personality will correlate to a slight degree because of the fact that each reaction of the person is the total response of an organism. The organism is the working unit, and the reaction is the integration of all its parts. Superior people in one thing tend to be superior in all things. When the average scores in the psychological measure of gifted groups are compared, as above, the gifted are usually superior.

THE OBJECTIVE MEASUREMENT OF INTERESTS. The objective measurement of interests is only begun; it is hardly out of the experimental stages. While the information test, as redefined for the measurement of interests, and the free association test, scored for commonness of group responses, seem decidedly to offer possibilities of an interest measure, other testing technique may yet be developed. Suggestions of criteria for the validation of interest tests come out of several investigations, particularly those of Terman and his co-workers. Reliable criteria are necessary to the development of measurement in any field. Out of the researches in the objective measurement of interests, which have been reviewed here, it may be possible to construct a theory of interest measurement. This will be the subject of the next chapter.

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CHAPTER X

THE MEASUREMENT OF INTERESTS

INTERESTS have been subjected to psychological measurement within very recent years. An early comparison of methods of interest measurement was published by Kitson (*11*) in 1916. Subjective and objective methods were classified under the older terms of experimental psychology into methods of impression and methods of expression, and there is much included in Kitson's review which is not thought of today as belonging to the field of interest measurement. A comparison of this early statement of the measurement of interests with the statement included here, clearly shows the development in the measurement of interests which has taken place primarily during the decade between the years 1920 and 1930.

AN EVALUATION OF THE MEASUREMENT OF INTERESTS. The present state of development in the measurement of interests corresponds to an early stage in the measurement of abilities. Twenty years ago there was one impressive scale for the measurement of abilities, the Binet-Simon scale, and many other experimental tests. In the measurement of interests, today, there is one outstanding measuring scale, Strong's "Vocational Interest Blank," with its scoring keys for various occupations, and many other experimental devices which may prove satisfactory in the future.

There is, however, an important difference to be noted in this comparison of development in the two fields of measurement. The measurement of abilities had achieved an objective basis by 1908. Today the objective measurement of interests is still largely in the experimental stage. It is in the measurement of subjective interests that there has been developed a technique which is as well-defined as in the Binet-Simon scale of 1908 and more complicated. It may be that a second decade will establish for the field of interests an objective measure.

If so, the subjective measures will, of course, go into the discard, unless they contribute something additional to the measurement.

Abilities have always been predominately objective in their definition, even prior to their measurement, while the early conceptions of interests are all subjective. In the field of interests there is the additional problem of finding out exactly what are objective interests, or what is the objective aspect of what are known as subjective interests, so that the measurement of interests may become an objective problem.

In the statistical treatment of the measuring scales, however, the field of interests is far ahead of the field of abilities of 1908. We know better, today, how to find out the value of an inventory or test than we did twenty years ago. The application of statistical methods to the measurement of interests, particularly to the subjective measures, shows that the scales and scoring keys are of suggestive value—not as suggestive as are measures of abilities today, but fully as suggestive as the ability measures prior to the World War, just before the publication of Yerkes, Bridges, and Harwick's Point Scale in 1915 and Terman's Revision of the Binet-Simon Scale in 1916. The validity coefficients of interest measures, in comparison with those of the measures of abilities today, are promising, and the applications of the interest inventories are as well advanced as the applications of ability scales in 1915.

Early Conceptions of Interests. Prior to the attempt at either subjective or objective measurement, interest was studied as a factor of experience, a part of the conscious stream of mental activity. The structural psychologist defined interest as feeling, an element of experience, or if not as a mental element, as a complex thought experience with a strong feeling component. The functional psychologist brought in the dynamic factor and defined interest as a moving, habitual experience with ideas of future reference and with a strong feeling component. This is the psychological analysis of interest which formed the background of the philosophy of educators as early as Herbart.

In the experimentation with interest it was soon found necessary to control the experience by a stimulus. Interest came tc

be defined by the objects and activities of stimulation. Of course, these stimuli may be living stimuli, and are more often people. For this designation of interests as stimulating objects and activities in the individual's environment, there was precedent from the measurement of abilities. The measurement of abilities is a measurement of the efficiency of reaction to certain, clearly defined, stimulating objects and activities.

Interest stimuli are things which stimulate an individual to react with feeling. When there is a feeling aspect in the experience brought about by their stimulation, the experience is an interest experience. The stimulus causing a pleasant experience is an interest. The stimulus causing an unpleasant experience is an aversion. The stimulus causing an indifferent experience may be termed an indifference, as far as feeling is concerned. Subjective interests and aversions, then, are defined in terms of objects and activities stimulating the individual to have feeling experience, and this experience can be estimated by the person being stimulated as to its qualities of pleasantness and unpleasantness, and as to the intensity or degree of the feeling. This was the conception of what have been called subjective interests, and upon which the inventory was developed.

THE INVENTORYING OF SUBJECTIVE INTERESTS. Interests and aversions may be classified, as have been abilities, into special and general interests. There might be inventories of special interests and of general interests, just as there are tests of special abilities or aptitude and of general abilities or intelligence. These general inventories could be classified into inventories of concrete, abstract, and social interests, according to the groupings of stimulating objects, just as have been the general abilities. There might be inventories of vocational and educational interests.

However, a different plan for the subjective measurement of interests has been followed. The inventories, with a few exceptions, have been developed to cover the whole field of stimulation. They have been made as general as possible. But the measurement has been specialized and defined by the scoring plan. Interests have been scored in special fields and a general interest inventory has been used for this purpose.

The inventorying of interests, as objects and activities stimulating feeling experience, and the testing of abilities, as objects and activities stimulating an efficient reaction, both deal with the same environmental factors stimulating the individual. The stimuli are the same. But the abilities are measured objectively, while inventoried interests are the estimates by the individual of his feelings. In the measures of abilities the efficiency of the individual's reaction is compared with that of other people. The person being tested is given something to do, and his score in the test is determined by how efficiently he does this thing. The criteria of efficiency are objective—what other people have done. The method of testing is objective, the testing is of objects that are manipulated verbally or otherwise. On the other hand, the interests of the inventories are subjective. They are the feeling experiences of the individual in relation to the objects which he plans to manipulate, has read about, or has already manipulated. The method of inventorying is subjective; it secures individual estimates of interests. The only part that is objective here is the scoring method which has been developed for group comparisons of interests.

GROUP INTERESTS. Kent (*10*) believed in 1903 that he had a test of group interests when he found that constructing a steam engine was an adolescent activity of 32 per cent of the successful engineers studied by him. This is probably the earliest attempt to estimate group interests.

In the use of the interest inventory the score is the degree of group interests. It is based upon the number of interests of a social group, such as a group of sportsmen, an occupational group, or a racial group like the Jews. Distinguishing group interests are secured by comparison of the interests of one social group with those of all other people. A scoring key is developed upon these interests as they are found in homogeneous groups. Whether an individual has the interests of a social group, and the numbers in which they are found, forms the basis of his score in that group's interests.

The group method of measurement with the inventory, which had its inception in the work of Yoakum and his students at the Carnegie Institute of Technology following the World

War, is the method most widely used in the measurement of subjective interests today. This method has been adopted by a long line of investigators; Ream, Freyd, Kornhauser, Hubbard, Cowdery, Strong, Jacobsen, and Garretson, are names that stand out in this field of standardized subjective measurements. It is a method of measurement of specialized interests and of the degrees of specialized interests.

Other methods of interest measurement may be developed. The group method of scoring is new with the interest inventories. Ability measures have limited their testing material to the field to be measured, while the interest inventories aim to include all interest stimuli and to score for specialized interests. It is possible to score the interest inventories for the total number of interests, or for the degrees of general interest, which is a measure of breadth of interest. Also, there might be developed a measure of the general commonness of interests by scoring for degrees of universality. Also, the inventory might be scored for degrees of dislike, in the study of aversions of social groups.

CRITICISM OF THE GENERAL INTEREST INVENTORIES. The present general interest inventories can be most severely criticized because of their sampling error. No systematic method has been used in selecting the items for these inventories. This is not the fault of any one investigator. Items have been discarded or accepted based upon the criterion that they were distinguishing interests between the two or more groups being studied by a certain investigator. The early inventories were built in this way. The later inventories were based upon the earlier ones. Items were added that were thought to be distinguishing interests for the groups with which the investigators were working. The product, as represented by the latest development of the inventories, is a collection of distinguishing interests. But how representative of the distinguishing interests of the different social groups, no one knows, and it is also unknown how balanced is this representation. Certain social groups may be distinguished by an inventory, because they have distinguishing group interests, and not others, because they have no distinctive group interests. On the other hand, certain social groups may not be distinguished by an

inventory because their distinctive group interests are not in the inventory or because they are not there in sufficient numbers to become evident.

The solution to this situation is in the correction of the sampling error. This might be done by beginning all over again in a revision of the general inventories, through the study of the interests of social groups, and the establishing of the common group interests of these social groups, and the selection of those interests that distinguish certain social groups from other social groups. These distinguishing group interests would make up the items of the inventory. The more probable solution, however, will be by trial and error procedure, based upon the present development, in the discarding of non-distinguishing items and the addition of all items when there is any indication by trial that they distinguish one social group from others.

UNIVERSAL INTERESTS. The study of universal interests has been neglected in building the interest inventories. There would seem to be common interests of all people, and many interests of high degree of universality. Such items might be used to form an inventory to measure universality of interests. But they would be excluded from the interest inventories which are prepared to differentiate specialized social groups.

Within each social group there are common interests, or interests that are common to a much higher degree than in other social groups. But social groups are interrelated in their interests. They are homogeneous in their interests in varying degrees. Some groups may have a close interest relation because they are part of a larger interest group.

A review of the studies of adolescent interests should throw some light upon the problem of the universality of interests in general and upon the commonness of group interest. Thorndike (*29*) studied the group interests of teachers and he offers preference tables of educational interests in high school based upon the reports of 13 groups totaling 525. English literature, history and science were the three leading high school interests of this occupational group. There are sex differences, the men favoring history and science. Latin is at the bottom of the preference table. Studies of children's interests have been

made in this country and elsewhere on a large scale, and in these investigations there may be valuable material for revising the interest inventories. Of course, one of the main sources in the search for group interests is the scoring procedure of the interest inventory. The scoring method suggests what items are universal interests, because they do not differentiate groups, and it indicates the common group interests which distinguish one group from another. But this information is secured after items are included in the inventory. Studies of universal and group interests should point the way for the inclusions of items.

UNIVERSAL VOCATIONAL INTERESTS. An important part of the inventories, as we know them today, is a list of occupations. There are studies which indicate the degree of universality of various vocational interests. Douglass (*6*) found that 30 per cent of high school seniors in the State of Washington wished to be engineers. Beeson (*2*) found that 30 per cent of the boys in a high school in Colorado wished to be engineers. Fulmer (*8*) made two surveys of the secondary schools of the State of Nebraska: in 1924, 20 per cent of the boys wished to be engineers, and 17 per cent in 1928. The universality of interest in engineering among boys would suggest that at some time almost every boy would wish to be an engineer. Similar evidence comes from counselors in secondary schools.

Douglass' survey also showed that 37 per cent of the senior girls in the State of Washington wished to be teachers. Beeson found 22 per cent in the high school in Colorado. Barnes (*1*) found 24 per cent wishing to be teachers in a study of London school girls. Fryer (*7*) found, in a genetic study of the interest histories of college students, that at some time during adolescence all the girls wished to be teachers. In the survey of the State of Nebraska high schools Fulmer found 53 per cent of the girls wishing to be teachers in 1924 and 44 per cent in 1928. To be a teacher is practically a universal vocational interest of girls at some time in their educational career.

These two occupational groups, engineering for boys and teaching for girls, probably have the highest degree of universality of vocational interest. At some time during adolescence

any boy is likely to think of being an engineer and any girl to play with the notion of being a teacher. Terman (*27*, 373-377) studied the universality of the vocational interests of a group of school children, ages 11 to 13, 267 boys and 260 girls. A list of 125 occupations was presented to these children for the marking of "the one occupation you are most likely to choose." These preferences have been classified into occupational groups. The percentage of universality of vocational interests is shown in Table CVII. The results from a group of about a thousand gifted boys and girls (I.Q. 140 and above) are included to indicate differences found for different intellectual levels of the same ages.

TABLE CVII. PER CENT OF UNIVERSALITY OF OCCUPATIONAL INTERESTS (TERMAN)

	Boys		*Girls*	
Occupational Group	*Normal*	*Gifted*	*Normal*	*Gifted*
Agriculture, Horticulture, Dairying, Stock Raising	0.0	3.8	0.0	0.2
Mechanical Trades, Building Construction and Manufacturing	13.2	5.5	5.4	0.6
Transportation	7.2	5.4	0.6	0.0
Commercial	8.1	8.5	1.0	2.0
Public Service	10.8	5.1	0.0	0.0
Domestic and Personal Service	2.1	0.5	15.3	22.8
Clerical Occupations	7.2	4.7	19.6	5.9
Artistic	4.9	9.1	14.0	23.6
Semi-professional	2.1	3.8	3.0	4.5
Professional	24.9	48.3	37.6	37.8
Social Work	0.7	1.2	1.0	1.7
Athletics	11.5	3.9	2.4	0.6

The professions stand high among these elementary school children as universal interests.

Fulmer (*8*) has ranked occupational groups in order of preference by boys and girls as the result of his studies of 26,000 high school students in 1924 and 39,000 students in 1928. These are shown in Table CVIII.

There is little important change in the rankings of the occupational groups between the 1924 and the 1928 studies. There are, of course, pronounced sex differences in all studies. These

TABLE CVIII. OCCUPATIONAL GROUPS RANKED ACCORDING TO PREFERENCES OF SECONDARY SCHOOL PUPILS (FULMER)

	Boys		*Girls*		
	1924	*1928*	*1924*	*1928*	
1.	Professions	Agriculture	Professions	Professions	1.
2.	Agriculture	Professions	Clerical	Clerical	2.
3.	Engineering	Engineering	Business	Art	3.
4.	Business	Business	Art	Business	4.
5.	Trades	Trades	Stage and Platform	Stage and Platform	5.
6.	Clerical	Transportation	Soc. and Rel. Service	Trades	6.
7.	Transportation	Clerical	Trades	Literary	7.
8.	Government	Athletics, Sports	Athletics, Sports	Soc. and Rel. Service	8.
9.	Art	Government	Literary	Communication	9.
10.	Athletics, Sports	Art	Agriculture	Agriculture	10.
11.	Soc. and Rel. Service	Science	Science	Government	11.
12.	Science	Literary	Communication	Transportation	12.
13.	Communication	Communication	Government	Athletics, Sports	13.
14.	Literary	Army and Navy	Engineering	Science	14.
15.	Stage and Platform	Soc. and Rel. Service	Transportation	Engineering	15.
16.	Army and Navy	Stage and Platform	.....	.....	16.

rankings are suggestive, as are those from Terman's study, in showing the degree of universality of vocational interests, but because various numbers of specific occupations are assembled into these large occupational groups the facts of universality are somewhat obscured. The 25 leading specific occupations in Fulmer's study are listed in order of popularity. They indicate better the occupations with the greatest degree of universal interest among boys and girls in the secondary school (Table CIX).

The studies of universal vocational interests include a number of suggestions for the development of the interest inventories. Evidently there is a geographical influence upon the universality of different vocational interests. Fulmer's study (Table CIX) shows "farmer" topping the list of occupational interests for boys. This study was made in Nebraska. It would not be expected that high school boys in New York City would rank "farmer" as their major vocational interest. To score the interest inventory for medical men might find "farmer" to be a medical men's interest to a high degree among a Nebraska group of medical men and not among a New York group of medical men. The implication is that any sample of workers in an occupation upon which an interest scoring key is going to be made must represent all sectional influences or it must be prepared for local use. The high degree of universality of certain occupations found in these studies would suggest that these occupations might well be left out, from the point of view of economy, of the general interest inventories which are built to differentiate occupational groups.

Universal Educational Interests. A section of the interest inventories is formed of distinguishing educational interests. Here, too, in building the inventory, there are suggestions from numerous investigations of children's educational interests, which have been made as a phase of the child study movement in Germany, Sweden, England and the United States.

Several studies of children's interests were made by Lobsien (*16, 17*), William Stern (*26*), and Wiederkehr (*30*) in Germany during the first decade of this century. The method was for each child to mark one subject which is liked best, or sub-

TABLE CIX. OCCUPATIONS RANKED ACCORDING TO INTEREST (FULMER)

	Boys		*Girls*		
	1924 Study	*1928 Study*	*1924 Study*	*1928 Study*	
1.	Farmer	Farmer	Teacher	Teacher	1.
2.	Engineer	Aviator	Stenographer	Stenographer	2.
3.	Electrical Engineer	Engineer	Nurse	Nurse	3.
4.	Mechanic	Electrical Engineer	Music	Music	4.
5.	Lawyer	Mechanic	Business	Bookkeeper	5.
6.	Business	Business	Bookkeeper	Business	6.
7.	Teaching	Medicine and Surgery	Clerical	Clerk	7.
8.	Civil Engineer	Teacher	Clerk	Office Work	8.
9.	Medicine and Surgery	Lawyer	Artist	Interior Decorator	9.
10.	Banker	Civil Engineer	Physical Director	Artist	10.
11.	Pharmacist	Electrician	Missionary and Red Cross	Secretary	11.
12.	Electrician	Banker	Medicine and Surgery	Dramatics	12.
13.	Salesman	Pharmacist	Secretary	Beauty Shop	13.
14.	Architect	Music	Dramatics	Librarian	14.
15.	Dentist	Merchant	Dressmaker	Journalist	15.
16.	Music	Salesman	Farmer	Dancer	16.
17.	Bookkeeper	Architect	Lawyer	Dress Designer	17.
18.	Merchant	Carpenter	Decorator	Clerical	18.
19.	Carpenter	Mechanical Engineer	Journalist	Dressmaker	19.
20.	Stock Raiser	Coach	Pharmacist	Telephone	20.
21.	Minister	Bookkeeper	Librarian	Medicine and Surgery	21.
22.	Aviator	Dentist	Author	Typist	22.
23.	Journalist	Stenographer	Dress Designer	Salesman	23.
24.	Coach	Journalist	Entertainer	Author	24.
25.	Stenographer	Forest Ranger	Actor	Seamstress	25.

jects first and second best, in a list of educational subjects presented to him for this purpose. The results from several thousands of children in the elementary grades in Germany show that for the boys physical education is most universally liked, and that drawing, arithmetic, and history come next in order as universal educational interests. Language, geography, and writing are the least universally liked by these German school boys. Among German school girls the more universal educational interests, in order, are manual training, physical education, and arithmetic. The least universally liked by these girls are nature study, natural history, and writing. Other, more recent, studies in Germany (*13, 18, 22, 25*) in general verify this evidence upon the universality of educational interests.

In these investigations into children's educational preferences in Germany, not only are distinctive sex differences found, but there are enormous age and grade differences. In his study of 6,248 German elementary school children, Lobsien (*16*) finds increases and decreases in popularity of different school subjects with advancing age. For religion, reading, singing, dictation, writing, physical education, history, and nature study there is a decrease with age for both girls and boys. For foreign language there is a decrease for boys and an increase for girls. Drawing and geography increase in interest with age for girls. Arithmetic and composition increase with age for boys, but decrease for girls.

In a study of 2,137 Swedish elementary school children, Brandell (*3*) shows that handwork, manual training, and history are most universally liked by the boys and domestic science, drawing, and history by the girls. The least universal in interest among boys and girls alike were writing, spelling, language, and geography. Among English elementary school children, Lewis (*15*) shows that drawing and the manual subjects, history and reading, are the most popular subjects, while grammar and geography are least liked.

Columba (*5*) has compared results from three countries, Germany, Sweden, and the United States, to note differences between countries. The investigation used in representing American children was Columba's study (*5*) of 1,664 Catholic

school children in Washington, D. C. Lobsien's investigation (*16*) of German school children and Brandell's study (*3*) of Swedish school children are used to represent foreign countries. In assembling these studies for comparison, Columba has eliminated all but the standard school subjects in the different lists. The ranked preferences of these children are given in Table CX.

TABLE CX. RANKED PREFERENCE OF ELEMENTARY SCHOOL STUDIES FOR THREE INVESTIGATIONS IN DIFFERENT COUNTRIES (COLUMBA)

American Children	*German Children*	*Swedish Children*
1. Religion	1. History	1. History
2. Arithmetic	2. Arithmetic	2. Reading
3. History	3. Reading	3. Arithmetic
4. Spelling	4. Geography	4. Religion
5. Geography	5. Penmanship	5. Geography
6. Language	6. Religion	6. Language
7. Reading	7.	7. Spelling
8. Penmanship	8.	8. Penmanship

History and arithmetic would seem to be the universal abstract educational interests of school children in all countries of western civilization. Geography holds a central position. Language and penmanship are less general in interest.

Columba (*5*) has investigated the universality of interest of various groups of American children. There are age, grade and sex differences, as in the foreign investigations. Thorndike (*28*, 209-26) reviewed the studies of educational preferences among school children generally and comes to the conclusion that arithmetic stands relatively high. There are exceptions, but the conclusions from all studies place the two abstract subjects, arithmetic and history, as universal educational interests among elementary school children with penmanship and language most universally disliked.

Terman (*27*, 363-369) has made one of the most thorough investigations in this field, as far as method is concerned. A list of 45 school subjects was presented to each child with the request to rank the first five according to preference. Rankings were secured from 135 boys and 127 girls of ages 11 to 13

in California public schools. The average (mean) rankings of the leading subjects are shown in Table CXI.

TABLE CXI. RANKING OF EDUCATIONAL INTERESTS OF BOYS AND GIRLS (TERMAN)

	Boys		*Girls*	
	Subject	*Average Rank*	*Subject*	*Average Rank*
1.	Games and Sports	1.23	Music (Instrumental)	1.52
2.	Manual Training	1.31	Spelling	1.56
3.	General Science	1.36	Music (Singing)	1.58
4.	Shop Work	1.55	Physical Training	1.66
5.	History (U. S.)	1.66	Games and Sports	1.68
6.	Reading	1.67	Folk Dancing	1.70
7.	Geography	1.73	Reading	1.71
8.	Nature Study	1.75	Cooking	1.76
9.	Physical Training	1.83	Nature Study	1.83
10.	History (Anc. & Med.)	1.83	General Science	1.85
11.	Music (Instrumental)	1.83	Arithmetic	1.87
12.	Spelling	1.90	Drawing	1.88
13.	Painting	1.92	Sewing	1.90
14.	Drawing	2.04	Painting	1.91
15.	Literature	2.06	Literature	1.95
16.	Agriculture	2.08	Geography	2.05
17.	Composition	2.16	Dramatics	2.06
18.	Civics and Citizenship	2.17	Penmanship	2.08
19.	Arithmetic	2.18	Grammar	2.11
20.	Folk Dancing	2.27	Agriculture	2.15
21.	Physiology & Hygiene	2.28	Physiology & Hygiene	2.26
22.	Penmanship	2.30	History (U. S.)	2.31
23.	Music (Singing)	2.35	Composition	2.32
24.	Grammar	2.37	History (Anc. & Med.)	2.33
25.	Debating	2.71	Modeling	2.43
26.	Modeling	2.79	Civics and Citizenship	2.54
27.	Dramatics	3.12	Debating	2.81

The interests of gifted children (with I.Qs. over 140) of the same age were also studied by Terman for comparison with this group. There were marked differences between the two groups. In general there was a preference to a higher degree on the part of the gifted for subjects demanding a larger amount of abstract thinking. It is evident that mental age as well as chronological age is an influence upon the universality of interests. The correlation between the interest of the nor-

mal and gifted boys is as high as .72, but that between the normal girls and gifted girls is only .17. Here there is a wider difference in the interests of girls of different mental levels than of boys.

Terman's study also indicates that the educational interests of the two sexes are sufficiently different to make it impossible to combine them for any practical use to which these results may be put. This is similar evidence to that coming from foreign studies. For Terman's group the correlations between interests of the two sexes are .42 for the normal children and .59 for the gifted children. There is added to the evidence of enormous age and grade differences coming from foreign studies the evidence of wide differences between groups of different sex and intellectual levels. This suggests difficulties in establishing scoring keys for adolescent groups and the desirability of limiting these keys to local use.

Important evidence coming from Terman's study refers to the educational subjects involving motor activity. These subjects, physical education, manual training, shop work, games and sports, are in degrees above all others the universal interests of normal boys. There are similar results from other foreign and American studies. For girls, also, such studies are of primary universal interest, but music, both instrumental and singing, is added.

The facts relative to universality or lack of universality of educational interests are material upon which to build that part of the interest inventories in which educational items are included. If interests discriminating groups are desired, then, of course, the less universal educational interests will be more likely to offer group discrimination. If a measure of degrees of universality is desired, then the more universal interests would be included in the inventory.

Universal Activity Interests. A large section of the general interest inventories is made up of activity interests. There is the same problem here of separating distinguishing group interests and universal interests. The degree of universality of the specific play interests from ages 8 to 22 has already been indicated. (Chapter X, p. 320.)

In much the same manner as that described above, activity

interests have been studied by Terman. (*27*, 377-379) A group of 267 boys and 260 girls, ages 8 to 13, in elementary school in California were asked to rate on a scale of five degrees certain general activities, like "studying your lessons." The activity preferences are ranked in Table CXII, showing which are more universally liked and which are less universally liked. The figures are the average (mean) of the ratings for the activity on a scale of five.

TABLE CXII. RANKED ACTIVITY PREFERENCES FOR BOYS AND GIRLS (TERMAN)

Boys		*Girls*	
1. Playing with several other people	1.51	1. Parties, picnics, club meetings, etc.	1.50
2. Games requiring much physical exercise	1.72	2. Playing with several other persons	1.60
3. General reading	1.77	3. Games requiring much physical exercise	1.68
4. Tools, apparatus, or machinery	1.89	4. Music, drawing, or dancing	1.72
5. Parties, picnics, club meetings, etc.	1.91	5. General reading	1.75
6. Games requiring little physical exercise	2.07	6. Sewing, cooking, housework, etc.	1.89
7. Being leader in a team or club	2.20	7. Study lessons	1.99
8. Study lessons	2.26	8. Games requiring little physical exercise	2.09
9. Playing with one other person	2.40	9. Playing with one other person	2.27
10. Music, drawing, or dancing	2.81	10. Being leader in a team or club	2.37
11. Playing alone	3.85	11. Tools, apparatus, or machinery	3.47
12. Sewing, cooking, housework, etc.	4.17	12. Playing alone	3.78

There are sex differences here as in occupational and educational preferences. Terman compares the preferences of about 1,000 gifted boys and girls with these preferences of normal children. There are fewer differences between these intellectual levels for activity interests than were found to exist among vocational and educational interests. There is a correlation of .87 for the rank order of these activity interests between gifted and normal boys, and a correlation of .86 between gifted and normal girls.

THE UNIVERSALITY OF GENERAL INTERESTS. Professional interests have been shown to have a high degree of universality, particularly among high school boys and girls. (Chapter V, pp. 163-7.) Cavan (*4*) has made a study of the universality of general interests among a group of 349 business girls under thirty years of age. A list of thirty general interests was presented in the form of an inventory for checking those activities which are liked. Fifteen of these interests (fifty per cent of the list) were liked by more than fifty per cent of the group (Table CXIII).

TABLE CXIII. PER CENT OF BUSINESS GIRLS LIKING GENERAL ACTIVITIES (CAVAN)

	Interest	*Per Cent Liking*		*Interest*	*Per Cent Liking*
1.	Travel	89.4	16.	Automobile riding	49.5
2.	Education	69.3	17.	Living at home	49.0
3.	Saving money	66.7	18.	More and better clothes	48.4
4.	Sports	66.2	19.	Own her own car	48.4
5.	Meeting new people	66.2	20.	Men friends	47.1
6.	Girl friends	65.3	21.	Help parents financially	47.0
7.	Reading	65.0	22.	Concerts, opera	41.8
8.	Girls' clubs	61.0	23.	Sew, embroider	41.3
9.	Marriage	57.3	24.	Play bridge	38.7
10.	Business life	57.3	25.	Day dreaming	38.5
11.	Dancing	56.7	26.	Mixed clubs	37.5
12.	Money	54.1	27.	New vocation	32.1
13.	Church	53.3	28.	Social service work	30.9
14.	Movies	50.1	29.	Living in large cities	25.6
15.	Theatres	50.1	30.	Living away from home	11.8

SIGNIFICANCE OF FACTS OF UNIVERSALITY OF INTERESTS. The facts of universality of interests are important in building interest inventories, in improving those in existence and in scoring for group interests. Many of the studies just reviewed suggest a fluctuation of interests during adolescence which may be so great that scoring for group interests at this time may be impractical. Besides the negative suggestion of the items to omit from the general interest inventories, because of their universality, there is the suggestion that studies of group interests during adolescence might determine levels of mental

and chronological age where permanence is sufficient for purposes of scoring. These general studies of children's interests lead to the conclusion that similar investigations made with the aim of determining adult group interests would be valuable in the development of the interest inventory.*

THE RELATION OF THE SPECIALIZED SECTIONS OF THE GENERAL INTEREST INVENTORY. A problem almost entirely neglected in the building of general interest inventories is the interrelation of the various specialized sections (occupations, amusements, educational subjects, peculiarities of people, and so on) in scoring for various group interests.

Garretson (*9*, 49-50) has studied the relative value of the various sections of his "Preference Questionnaire" in the selection of commercial, academic and technical educational interests. The sections of the inventory, representing the interests in different fields of stimulation, are of differential value in the different scoring keys. This is shown in Table CXIV, where the interest scores are correlated with criteria. In general, as shown by the averages of the correlations, those sections of the inventory relating to the occupations have the greatest value in differentiating groups.

TABLE CXIV. COMPARISON OF SPECIALIZED SECTIONS OF GARRETSON'S PREFERENCE QUESTIONNAIRE FOR DIFFERENTIATION VALUE (GARRETSON)

Sections	*Commercial Scoring Key*	*Academic Scoring Key*	*Technical Scoring Key*	*Average (Mean)*
1. Occupations	.63 ± .05	.49 ± .05	.58 ± .05	.52
2. Activities	.31 ± .06	.15 ± .07	.65 ± .05	.37
3. Things to own	.34 ± .06	.24 ± .07	.51 ± .05	.36
4. Magazines	.20 ± .07	.01 ± .07	.44 ± .06	.22
5. School subjects	.22 ± .07	.09 ± .07	.32 ± .06	.21
6. Qualities you admire	.09 ± .07	.24 ± .07	.39 ± .06	.24
7. School paper	.53 ± .08	.35 ± .09	.62 ± .06	.50
8. Prominent men	.26 ± .10	.56 ± .08	.61 ± .07	.48
9a. Activities of father	.13 ± .07	.30 ± .06	.18 ± .07	.21
9b. Activities of mother	.14 ± .07	.43 ± .06	.19 ± .07	.25

* Just such a study as is suggested here has been made for women's occupations by Manson (Manson, G. E.: "Occupational Interests and Personality Requirements of Women in Business and the Professions," *Michigan Business Series*, 1931, III, No. 3, 281-409), which was published after the text of this book had been printed. The extent to which 13,752 business and professional

A DEFINITION OF INTEREST INVENTORY SCORES. With these suggestions from research for the improvement of the general interest inventories we will pass on to a definition of the subjective interests which are being measured. Interests should be defined upon their measurement. This is the only scientific kind of definition. The measures are inventories and rating scales. These scales assemble estimates of pleasant, of unpleasant, and of indifferent experience. In their measurement subjective interests are qualitative differences in feeling experience.

The term "interest" is used in this broad sense to refer to feeling experience in a field of stimulation. It includes within its meaning the pleasant, the unpleasant and the indifferent experiences. Used in the narrower sense, however, the term "interest" refers only to the pleasant experiences, the "likes" of the inventory.

The wider scope of the meaning of the term has grown out of the measurement of interests. All interests, aversions, and indifferences are assembled together to give a score of the number of the feeling experiences which are like those of a certain social group. It is probable, however, that the feeling experiences which link a certain social group together are predominately pleasant experiences, or interests in the narrower sense. The interest score is the assembled estimates of likes, dislikes, and indifferences, made by the individual during specific stimulation. It is the quantitative statement of his usual feeling experience in relation to the interests, aversions and indifferences of the social group.

THE OBJECTIVE MEASUREMENT OF INTERESTS. With the general turning of psychology, during the last decades of the nineteenth century, towards an objective approach in the study of mental phenomena, there has developed not only an interest in objective experimentation but an even greater interest in standardized measurement. This interest in objective measure-

women mark "like," "dislike," or "indifference" for the various items of Manson's inventory of "Occupational Interest Blank for Women" is shown, and the position below or above an average for each of the 160 items in the inventory is indicated for 14 occupational groups and the specific occupations of private secretary, office manager, bookkeeper, stenographer, office clerk, high school teacher, grade school teacher, trained nurse, sales proprietor, retail saleswoman.

ment began where it was easiest, in the measurement of the efficiency of reactions, the human abilities, but it has gradually moved in the direction of other personality measures, such as the interests, motivation, and emotions.

The objective measurement of interests is a product of the last decade. The earliest attempt at objective measurement of interests was with the information test by Wissler in 1895. With the exception of two objective tests in Kelley's questionnaire of interests in 1913 and the "Range of Interest" Test made in 1916 by Robinson, working at the Carnegie Institute of Technology, there is nothing further until about 1920. The trial of the information test in the measurement of interests seems to have been an independent idea of a number of investigators. O'Rourke, Toops, Burtt, and McHale have used this form of objective measurement most extensively. The idea of applying the free association test as a measure of interests is the product of Leland Stanford University in work reported by Wyman in *The Genetic Studies of Genius* in 1923. The information test and the free association test are the two major objective approaches in the measurement of interests.

Objective Group Interests. These two objective measures use different methods of measuring interests. But both of them follow the plan of separating those persons with certain specialized and homogeneous interests from other people. The information test of interests is usually developed according to the plan of measuring a specialized field of information. Degrees of interests are found which indicate many or few interests in the specialized field. The free association test of interests is developed along the same line as the inventories measuring subjective interests. It plans to be general in its stimulation and to classify the responses according to their significance as specialized group interests.

The information test of interests is, according to its aim, a specialized test. For this reason, in using it for purposes of vocational and educational guidance, one test must be administered for every field for which there is desired a measure of the person's interests. With the free association test, the test needs to be administered only once, after which it can be scored for commonness of the responses in many different specialized

fields. But both scoring plans could be applied to either form of testing interests. The plan used in the information tests would seem to be more easily applied to the development of tests. But the plan used in the association test would seem to be more usable in guidance work. Both plans reach the same goal, which is a qualitative classification by objective measures of individuals into social groups according to their interests. The goal is the same as for the subjective measures. It is a measure of specialized interests and of degrees of these specialized interests. The factor of the degrees of the specialized interests has been given little consideration excepting in the information test, where individual differences stand out quite clearly.

A Definition of Objective Interests. Objective interests must be defined upon their measures in so far as these measures lead the way to a definition. There is greater difficulty here than with subjective interests. Most of the measures of objective interests are tests of amount of information. But the measure is not of intensive information, as would be tested in an achievement test. It is of superficial knowledge of an extensive sort, covering widely a field of stimulation. In the free association test the free association is the indicator of information. The person being tested indicates his knowledge by his responses. In the information test the stimuli are arranged to cover a field of stimulation, and knowledge is indicated by correct answer.

Objective interests, then, would be defined as superficial and extensive information in a clearly defined field of stimulation. This is what the tests of objective interests measure. Objective interests may be regarded as knowledge or information of a superficial sort, extending widely over a well-defined field of activity, which may be taken to indicate a tendency of the individual to react to stimuli in that field of stimulation.

Two Aspects of Objective Measurement. According to current conceptions, an objective measurement of interests would involve two aspects of behavior: (1) the direction taken by the reaction, which would determine the specialized kind of information gained, and (2) the drive of stimulation, which would determine the amount, in this search for information.

These two aspects of interest behavior can be defined as follows:

1. *The Direction Taken By the Reaction.* While the efficiency of the reaction is regarded as the criterion of ability, the direction taken by this reaction may be thought of as the interest aspect. A turning toward the object of stimulation would appear to be an interest reaction, and a turning away would be an aversion reaction. Indifference would be represented by no such turning, but, of course, there would be an efficiency aspect to the reaction. Seeking and avoiding reactions would be evidence of interests and aversions. Activity in the direction of the stimulus is an interest and away from the stimulus is an aversion.

2. *The Drive of Stimulation.* A second aspect of interest behavior, as occasionally conceived, is the drive of stimulation. Stimulation of an individual may be of a sort which is quickly removed by the reaction, as in a reflex, such as the patellar reflex or pupillary reflex; or it may be of a nature that continues to affect the person until numerous reactions of a successive or serial sort have taken place and a final reaction removes the stimulus. For a clearer description of the latter kind of stimulation, the term, driving stimulus, is used. The driving stimulus is the cause of motivation.

An explanation of the reaction to driving stimulation may be sought in the physiology of nerve excitation. The driving stimulus is a stimulus toward which the organism must react until the stimulus is removed. Biological driving stimuli are those of hunger pressure in the stomach, nausea pressure in the esophagus, and other pressures and pains upon interoceptors. These are the early interests and aversions of the child, to which he must react. Learning is an association of new stimuli to these biological driving stimuli. Most of these new stimuli are social. Most of the interests and aversions of the adult are social stimuli.

The persistence of stimulation, the driving strength of objects of interest and of aversion to cause reactions, is this second aspect. This aspect of the reaction has been dealt with experimentally as motivation, but it is the aspect of the reaction which applied psychology in industry and education has thought

most pertinent in stimulating work by means of what are called incentives.

ARE THERE SIMILAR ASPECTS OF SUBJECTIVE INTERESTS? That there are two aspects of interests viewed objectively, one the drive of stimulation and the other the direction taken by the reaction, calls for a reconsideration of interests viewed subjectively to see if there are these two aspects there. Subjective interests are defined as estimated interests and aversions, likes and dislikes in the experience of the person. The objective correlate to subjective interests would seem to be the direction taken by the reaction, toward or away from stimulation. But, of course, the experimental demonstration that these subjective and objective interests are the same thing has yet to be performed.

The subjective correlate to the drive of stimulation would seem to be the dynamic factor in the development of mental experience, the movement and oscillation of attention. A measure of this aspect is probably included in the subjective measurement of interests, in much the same manner that motivation is included in the objective measurement of interests, as an influence upon what is liked, just as the driving stimulus would influence the kind of information gained. This is the aspect of conscious activity long ago dealt with by functional psychology. It is the influence of the intent, the purpose, the *Aufgabe* of experimental psychology. A crucial experiment here would be to correlate the motivation of mental experience with the motivation of the reaction.

AN ACCEPTANCE-REJECTION THEORY OF INTEREST MEASUREMENT.[1] In the subjective measurements of interests and in the objective measurements of interests, as we have them today, both aspects, the acceptance-rejection aspect and the motivation aspect, would seem to be present. But the more prominent aspect in these measurements is undoubtedly the acceptance-rejection aspect. In the inventorying of likes and dislikes, the acceptance and rejection of objects of stimulation is definitely what this measurement aims to measure. In the information test, applied to the measurement of interests, there

[1] This theory was presented in a paper at the Eighth International Congress of Psychology at Yale University, New Haven, in September, 1929, and published in the *J. of App. Psychol.*, 1930, XIV, 549-56 as "The Objective and Subjective Measurement of Interests—An Acceptance-Rejection Theory."

is an acceptance or rejection in a definite field of information. In the free association test, an acceptance and rejection of stimulation is indicated in the response, which is scored in the same manner as the subjective inventory, for acceptance, by similarity to group interests, and for rejection, by lack of similarity. While motivation would seem to influence these measures, its influence would be the same as that upon a measure of ability. It is extraneous to the measurement. Motivation is distinguished from interests as a separate aspect of mental life.

Now that the ground is cleared, let us make a statement of theory based upon the aspect of acceptance and rejection of stimulation. The objective turning toward stimulation or turning away from stimulation is an acceptance and rejection of stimulation. Objective interests are acceptance reactions, and objective aversions are rejection reactions. It may be that the acceptance, or turning toward stimulation, and the rejection, or turning away from stimulation, is correlated with pleasant and unpleasant experience. Subjective interests, or likes, would appear to be acceptances of stimulation and subjective aversions, or dislikes, would appear to be rejections of stimulation. At any rate, they may be regarded as acceptance-rejection experiences.

In outlining such a theory the author fully realizes that he has discovered nothing new in psychological activities. Theoretical statements of the nature of interests have been formulated by various and numerous early psychologists. In many of these theories there has been included all that is now defined as interests, and frequently more. The problem has been one of removing those psychological activities from the definition which are not *measured interests.* An acceptance-rejection theory brings the theory of interest in alignment with the facts which measurement has produced during the last decade.

The major contribution of the theory lies in its definition of interests and motivation as separate in mental life. Measurement during the last ten years is responsible for this. Woodworth, writing in 1918, shows the two, motivation and interests, in relation. "To sum up," says Woodworth, "almost any object, almost any act, and particularly almost any process or change in objects that can direct one's own activity towards

some definite end, is interesting of its own account, and furnishes its own drive, once it is fairly initiated." (*32, 202*) The educational theories of interests from Herbart to Dewey have taken a similar point of view.

But measurement has distinguished motivation and interests as distinct kinds of psychological activity. There is the driving energy of stimulation, and there is the acceptance or rejection aspect of the reaction. For example, there may be a strongly motivated experience, which also may be pleasant or unpleasant. The latter is, of course, the subjective interest or aversion. There may be, for example, a strongly motivated reaction. This reaction may be a turning toward or away from the object of stimulation, which is the objective interest or aversion. The motivation is defined by its measurement as a degree of stimulation, whether observed objectively or subjectively. It is an energy aspect of experience or reaction which is present in degrees. On the other hand, the interest is a qualitative change. The measurements of motivation and of interests, separate the two from further experimental confusion.

THE DEVELOPMENT OF INTEREST MEASUREMENT. With the acceptance-rejection theory as the critical basis for the measurement of interests there should be a trial, along with those at present considered, of other established mental measures. The purpose would be to get at the factor of acceptance and rejection of stimulation in mental life. Probably many measures of abilities include this factor in their measurement. The problem is one of distinguishing it by tests from other objective measurements.

Alfred Binet in 1905 made the first general measurement of human reactions. His scale proved to be a test of the efficiency of reactions. Later emphasis in the measurement of abilities, as this kind of measurement came to be called, was upon the elimination of influencing factors in the testing of abilities, such as motivation and emotional stability. If these variables could be removed in the testing technique, it was thought that a pure measure of the abilities, or the efficiency of reaction, would be secured.

It was recognized, of course, that the personality factors removed from the testing were possible influences upon the work

accomplished, that they were related to achievement. But they are variables which were found difficult to control in the standardizing of the measures of abilities, and so the attempt was made to eliminate them from this kind of measurement and to secure a pure measure of the efficiency of reaction.

SEVERAL ASPECTS IN THE MEASUREMENT OF THE HUMAN REACTION. This attempt to secure a pure measure of abilities has brought to light many other aspects of personality which affect the happiness and achievement of the individual. In the understanding of the human personality these must be investigated. In the clinical study of the individual the whole story must be told, if possible, in order to achieve a better adjustment to life.

Five aspects of measurement of the reaction may now be distinguished as having developed out of a growing interest in other personality factors than those of abilities. We only know a thing by its attributes or aspects. A stone has shape, weight, color, and other means by which it is known. These are its aspects. Remove them and the stone does not exist. Body and mind are two aspects of life. They are like the half-moon with a concave and convex surface. Remove the two aspects by which life is known and life does not exist. Five aspects of the human reaction are described by their measurements:

1. *The Abilities,* a measure of the efficiency aspect of reaction. Included here are the group and individual general measurement scales of abstract, concrete, and social intelligence or abilities. In these fields, scales like the Stanford-Binet, Pintner-Paterson Performance, Army Alpha, Stenquist Assembling Test of Mechanical Ability, MacQuarrie Tests of Mechanical Ability, Moss Social Intelligence Test have been developed. Tests of special abilities have been devised, such as the tapping, steadiness, and aiming tests which measure the accuracy of coordinations; observation and judgment, and vocational and educational abilities, are measured by numerous scales. All of these scales aim at a measure of the efficiency of reaction.

2. *The Interests,* a measure of acceptance-rejection aspects. Included here are the inventories of vocational, educational,

social, and intellectual interests and the objective tests which are being used to indicate the interests of the individual. These scales aim to distinguish the interest aspect of the reaction from all others, particularly from measures of abilities.

3. *Motivation,* a measure of the drive, the urge, the persistence aspect of the reaction. There are no tests which can be said to measure motivation. Possibly the Downey Will-Temperament may do so to a slight degree. Only recently, particularly in animal psychology, has experimentation begun upon the problem.

4. *The Emotions,* a measure of stability, of the abortive and inhibition aspects of the reaction. Included here are the psychoneurotic and mental hygiene inventories, such as the Colgate Mental Hygiene Test, and the experimental tests of emotional control.

5. *General Habits,* a measure of the habitual aspects of the reaction. General habits of reaction are transferred in degrees from one field of stimulation to another. For example, industrious habits of study are an indication to some degree of industrious habits of work in the whole mental field. The transfer is to the degree of the likeness or commonness of the habits to be used in the new field to those in the old field. General habits of living have been measured in such fields as moral character, industriousness, leadership, and social ability. Attitude measurement would seem to be a subjective approach to general habits with an inclusion at times of the influence of interests and emotions. This field of measurement is not as yet clearly defined.

These are five aspects of personality, which measurement is developing. These five may be subdivided into smaller divisions. Future developments may indicate somewhat different divisions.

THE DUAL APPROACH IN THE MEASUREMENT OF INTERESTS. There is, of course, a dual approach to measurement of any one of these aspects of the reaction. There are the subjective and objective sides to measurement.

In the subjective measurement of interests there are the inventories and the rating scales, which are based upon an estimate by the individual of how he has reacted in the past or would react in the future to the stimuli of the test. Strong's

interest inventory and Kitson's rating scale are illustrative of this method. Both of these are estimates or ratings by the individual of his interests. Also, there is possible the application of the rating scale and inventorying technique to estimation of an individual by others. In the Colgate Mental Hygiene Inventory of the emotional aspect of the reaction, there are two inventories, one to be filled out by the individual being tested and the other to be filled out by someone else who has had an opportunity to observe his reactions. The subjective measures of interests are classified according to the method of measurement used, as follows:

1. Inventories or questionnaires
   a. By self
   b. By others
2. Rating scales
   a. By self
   b. By others

Then there is the objective approach. The objective method is a measurement of the reaction to stimulation, in which the estimate by the person being tested or by others is not considered. It is a measure of his reaction to standard stimulation conditions. The objective measures of interests are classified according to the method of measurement used, as follows:

Information Tests: true-false, completion, multiple choice forms.
Free Association Tests: discrete form.
Learning Tests: paired associations form.
Distraction Tests: verbal form.
Other Experimental Tests.

CONSTRUCTION OF PSYCHOLOGICAL MEASURES OF INTERESTS. In the trial of new interest measures and in the development of present inventories and tests it is well to follow established principles of mental measurement. Mental measurement principles have been developed largely in the measurement of abilities. For this reason they may not always apply to interest measurement. But they should be followed until the interests are proved to be different to the abilities in mental organization. The principles of mental measurement will be reviewed briefly here.

1. *Sampling Procedure.* The first principle of mental measurement is that the test, inventory, or rating scale, must sample the field of stimulating objects and activities to be measured. This may be achieved in several ways. The measure may sample these stimuli in the field to be measured in the same manner that the Army psychologists secured a sample of the two million intelligence records accumulated during the World War, that is, by a random selection from this vast number of a group of 100,000 records. A psychological measure should sample the objects of test stimulation in the same way that specimens of blood may be taken to represent the condition of the blood for all people. Obviously, any psychological measure is a true measure only to the extent that its problems include or represent the field of stimulation to be measured.

A representative measure is sometimes achieved in another way, however. Testing materials may be selected by chance, or by analogy, and after a trial, a comparison made with criteria to show if they are measures of what is desired to be measured. The general inventory for the measurement of interests has been developed in this way.

2. *Standardization of Psychological Measures.* The measure of any psychological trait, it is assumed, should approximate a normal distribution of scores. That is, there should be low and high scores, and about as many low as there are high scores, with the large bulk of the scores clustered about the average. The differences between individuals in any psychological trait that has been measured are found to distribute themselves over a wide range with variations continuous from one extreme to the other, and with a gradual diminution from the large bulk of cases clustered at the average to the extremes. If this is not found to be the situation when the test or inventory is used to measure a representative group of people, then the problems of the test should be changed to bring this about according to the theory of the normal curve in the measurement of all psychological traits. The degree of the difficulty of the problems must be revised so there is a normal distribution of cases. This is the process of standardization.

3. *Validity.* A third principle in the construction of psychological measures is the testing of their validity. By this is

meant the evaluating of the measuring scale against criteria. If the sampling of reactions were accurately done the measuring scale would be valid, but one cannot always be sure of this with the various selection methods of testing devices. So the scale is compared with estimates in the field to be measured, or with any other criteria, such as production records and established scales in the same field of measurement. The establishing of criteria for the validation of interest measures is one of the important problems of interest measurement today.

4. *Reliability.* It is necessary to know the reliability of a psychological measure. Does it measure the same thing when given again? The reliability is usually found by repeating the scale upon the same group within a short period of time and comparing the results by the correlation coefficient.

5. *Norms of Comparison.* In the construction of any psychological measure there must be norms of comparison in order to know the meaning of an individual score. When the scale is established it is given to a representative group of people. If it is a test of intelligence, the sample must represent all people. If it is a specialized interest test of medical men it must represent the interests of medical men, and so on. Once given to a representative group, percentiles are worked out and a scale of norms provided, which shows what percentage of individuals can be expected to fall below any score in the scale. A table is devised of comparative score-percentile values, which can be used to give meaning to any one tested in the future.

THE CRITERIA OF INTERESTS. It has been said that the greatest problem in the measurement of abilities is the establishing of good criteria with which to validate the ability measures. Though a new aspect of mental measurement, interest measurement faces this same problem. What criteria have already been used in the validation of interest measures? We will review them.

In the field of subjective measures Hubbard used self-estimates. Strong used self-estimates and jobs accepted. In the field of objective measures a variety of criteria have been used. Burtt used teachers' estimates of interests. Wyman, working with the Free Association Test, used teachers' rankings of interests. McHale, working with the Information Test, used

self-estimates of interests and employers' estimates of success. The criteria largely used in the validation of the interests measures, to date, have been estimates of some sort.

Other possible criteria of interests are educational courses chosen for study and occupations accepted. Wilson (*31*) used the selection of courses by students and the relative achievement in courses taken as criteria of interests in the study of college students' majors. Employment turnover in industry and commerce would seem to be an indication of interests. This criterion has objective definition, although it is difficult to find in the turnover records an equal basis of comparison. Kitson (*12*, 29-52), in a summary of labor turnover and its causes, regards interests as an important factor. Numbers of absences and tardinesses, both in industry and education, might be used as criteria of interests. Achievement in industry and education has been used as a criterion in the validation of interest measures.

From Terman and his co-workers (*27*, 441-454) comes the suggestion that numbers of books read might be used as a criterion of intellectual interests. Also, numbers of collections (*27*, 379-382) and things done by people (*27*, 425-429) might be used as criteria of activity interests.

A comparison of criteria is necessary in order to know their relation and validity as indicating the same thing. A comparison may be made of two subjective criteria, estimates of interests and estimates of ease of work. Terman (*27*, 363-373) shows that estimates of educational interests and estimates of ease with which subjects are mastered are fairly closely related. Columba (*5*) finds that 20 per cent of the choices of 356 elementary school children of subject liked best and of easiest subject are the same. Terman had two groups, a gifted group of 643 children (I.Q.s 140 and above) and a normal group of 527 children rate a list of educational subjects upon a five-point scale of preference and then put an *x* before each subject that was easy. These ratings by each child were assembled into an average rating of the group for each educational subject. The comparison was between ranked ease of work and ranked preference for each group. The correlations are given in Table CXV.

TABLE CXV. COMPARISON BETWEEN ESTIMATED EDUCATIONAL INTERESTS AND ESTIMATED EASE OF WORK (TERMAN)

Groups	*Correlation (rho)*
Gifted Boys	.611
Gifted Girls	.638
Normal Boys	.561
Normal Girls	.555
Average { Mean	.574
Average { Median	.586

Both of the ratings were secured at the same time, which usually causes ratings to be somewhat alike. Ratings may also be alike because there is little distinguishing on the part of the rater between the two qualities being rated (the halo effect). Children and average adults do not analyze their environmental stimulation into its parts.

A comparison of the estimates of interesting activities and things done by these individuals is a comparison of subjective and objective criteria of interests, but it would seem to be premature to attempt to draw any conclusions of the correlation of subjective and objective interests from these data. Rich (*24*, 52) studied 287 working girls in Cincinnati. Their order of favorite recreations (subjective interests) and their order of recreations actually engaged in (objective interests) are not very closely related (Table CXVI).

TABLE CXVI. ORDER OF INTERESTS AND ACTIVITIES OF 287 CINCINNATI WORKING GIRLS (RICH)

Estimated Favorite Recreations	*Actual Recreations*
1. Theatre	1. Reading
2. Athletics	2. Theatre
3. Dancing	3. Amusement Parks
4. Reading	4. Dates
5. Music	5. Dancing
6. Dates	6. Musical Concerts
	7. Gymnasium

Lehman and Witty (*14*, 54) show that passive recreation is engaged in by a group of 764 girls between the ages of 16 and

21, while their personal preferences are for more active recreation. Mitchell (*21*, 154 ff.) studied 10,052 high school and grade school boys and girls in Chicago. While 64 per cent went to the movies once or twice a week, 66.8 per cent preferred hiking to movies and 72.2 per cent preferred parties to movies. These figures do not indicate a close relation between the two criteria, one subjective, the estimates of activity interests, and the other objective, the actual activities engaged in. That these two criteria of interests do not correlate highly is evident.

The criteria of interests are listed here (Table CXVII) to show what are being used in the validation of interest measures. These criteria, of course, are not all of equal value. Their relative value is not known. The subjective and objective criteria are separated in the table.

TABLE CXVII. THE CRITERIA OF INTERESTS

Subjective Criteria	*Objective Criteria*
1. Self-estimates	1. Educational Courses Chosen
2. Teachers' Estimates	2. Occupational Jobs Accepted
3. Parents' Estimates	3. Activities Engaged in (Things Done)
4. Employers' Estimates	4. Labor Turnover
5. Friends' Estimates	5. Absences and Tardinesses in School
6. Scores in Interest Inventories	6. Scores in Objective Tests
7. Rating Scale Ratings (e.g., Kitson's Rating Scale)	7. Readings of Adults and Children
8. Estimates of Ease of Work	8. Absences and Tardinesses in Industry
9. Estimates of Ease of Study	9. Educational Achievement
	10. Industrial Achievement

Estimates have been used as the criteria in the early validation of ability measures. After one test is established as a valid measure it is used as a criterion for the validation of other tests. For this reason the Number Six has been included in both lists of subjective and objective criteria. Existing measures are perhaps the best validation criteria when there is some practical understanding attained through use of what they measure. While estimates are usually relied upon as criteria

in the beginnings of any test it would seem that the rating scale technique, such as has been applied by Kitson, might better be substituted for these raw criteria.

MEASUREMENT RESEARCH. The measurement of interests, and particularly measurement by objective methods, is a field of research which is ready for rapid development. The trail has been blazed and the ground broken. There is a sufficiently clear definition of what is being measured so that progress should not be retarded by the further use of blind probing methods.

Suggestions for research are coming from various sources. Every piece of research which is published is full of suggestions of what might be done to improve the measurement devices of today and to develop the existing concepts of measurement in the field of interests. As the result of the Atlantic City conference upon "The Measurement of Interests," held in connection with the National Vocational Guidance Association meeting in 1930, a research committee upon the measurement of interests was appointed, which was composed of the following psychologists: Karl M. Cowdery (Stanford), Douglas Fryer (New York), Harry D. Kitson (Columbia), Donald G. Paterson (Minnesota), E. K. Strong, Jr., (Stanford), R. S. Uhrbrock (Cornell). This committee was unanimous in the opinion that careful research should be stimulated to evaluate the present interest measures and interest concepts in psychology, and as a step in this direction the results of a survey of contemplated research have been published. (*23*) This report lists and describes, with the name of the research worker contributing the suggestion, over fifty research topics in the field of interest measurement. These topics are classified under the following headings, which indicate the scope of contemplated research:

The Development of Interests and Their Foundation in Training and Inheritance
Interests and Achievement
Improving the Interest Inventory and Its Scoring
Developing Norms for the Interest Inventory
Objective Methods of Measurement
The Rating Scale

Interests of Abnormals
Social, Racial, and Geographic Differences in Interests
Special Guidance Problems

There are at the time of this writing (1930) about twenty-five psychologists, almost wholly in the United States, who are doing work, and stimulating research among their students, upon interest measurement. This is a conservative estimate, which includes those who have a program of interest research under way for themselves or for their students.

The major research projects which are now considered to be most important in the development of interest measurement are listed below as the closing suggestions of this chapter.

1. A *comparative study* of objective and subjective measures, for example, an interest inventory and an information test of the same content.
2. A *revision* of the interest inventories to include all possible occupational, educational, and social interests and aversions, which are group differentiating items.
3. The development of *occupational* information tests of interests with an extensive selection of testing material.
4. The development of *educational* scoring keys of the interest inventories for various departments of the educational curriculum and for specialized courses.
5. A trial of various *objective experimental devices* as measures of interests, such as: (1) distraction technique, in which the measure is of attention to a specific task; (2) motion picture technique for the presentation of interests, after which a recall test might indicate the fields of interests; (3) the use of nonsense materials, such as ink blots, syllables and figures, as stimuli for free associations; (4) a measure of slight involuntary movements, by the automatograph or planchette, during the presentation of interests; (5) a measure of physiological processes, such as glandular secretions, during the presentation of interests.
6. A *trial of various experimental devices* for the improvement of the subjective estimate of interests. The presentation of materials (names of activities, pictures, and so on) might be (1) in the form of paired comparisons (Toops' paired comparison machine is built for this purpose) for the selection of the one liked best or the one liked least, (2) in the form of a list for the items to be ranked in order from like to dislike, (3) in a form for the rating of each item in several degrees, from extreme like to extreme dislike, (4) in forms of symbols of like,

dislike and indifference, which could be presented in various orders and the effect of the order studied.

7. A *trial of scoring keys* of the interest inventories *for various special groups:* (1) racial groups, such as the Jews and Negroes; (2) national groups, such as the French and Germans; (3) groups based upon geographical differences, such as rural and urban, (4) avocational groups, such as golf and baseball fans; (5) abnormal groups, such as the psychæsthenic and paranoid; (6) scholastic honor groups, such as members of Phi Beta Kappa and Sigma Xi; (7) secret organizations, such as the Knights of Columbus and Masons; (8) religious movements, such as the Catholics and Baptists; (9) social-economic levels, as shown by tests; and so on.
8. Further development of Strong's "Vocational Interest Blank," *validating existing scoring keys,* and *making new scoring keys,* particularly for tradesmen, such as carpenters and machinists.
9. Further development of Wyman's "Free Association Test of Interests," *making occupational and educational scoring keys.*
10. The investigation of *universal subjective interests* and aversions for the purpose of establishing an inventory measuring degrees of common interests of all people, and to indicate those interests which have a high degree of universality among various occupational, educational, and other social groups. Also there would be the question of the overlapping of group interests among occupational groups that are alike in function.
11. The development of *rating scales* of degrees of group interests for use by employers, parents, teachers, and the individual.
12. Investigations into the *development of subjective interests* to indicate when group interests (occupational or otherwise) stabilize sufficiently for measurement. This is a retesting of the problem of permanence from the point of view of measurement. It should answer the question at which age interests show a sufficient degree of permanence for measurement. It is probable that mental as well as chronological age is a factor to be considered. Another factor is a possible difference in fluctuation of various interests. This whole problem must be cleared up before interest inventories (and rating scales) can be used with authority in the early years, possibly under 18 years of age.
13. An investigation of the *effect of instruction* upon the development of interests, such as a course in vocations, try-out vocation courses, pleasant and unpleasant experiences, easy and difficult work, and so on.
14. Finally, research *establishing norms* of development of interests, in educational courses, in occupations, and in any field of group interests. Important questions to be answered by measurement for the practical purposes of human adjustment are:

a. What degree of interest development is desirable for achievement in the interest field?
b. What degree of interest development is necessary for a happy adjustment in the interest field?
c. What degree of interest development in a specialized field is desirable from the point of view of an all-round general development of interests?

This is a listing of major projects in which the specific research problems of interest measurement are only suggested. No attempt has been made to list these projects in the order of importance. The first project would seem of greatest theoretical importance to psychology, and the last is of greatest practical importance to human adjustment.

There is, in addition to these projects, the attempt to analyze the statistical technique of interest measurement. For instance, the definition of what is the reliability of interest measures is under question.

It will be noticed that the two major practical research problems of ten years ago, that is: (1) The study of the permanence of interests for the prediction of future interests; and (2) The study of the relation of interests to abilities for the prediction of abilities, are not included as major research problems of today.

The second of these two problems evolved around a misconception in mental measurement. If interests and abilities are the same they should be called one or the other, and not both. If they are different they are not closely related. A real difficulty in measurement lies in securing pure measures. An inventory or test may be a measure of both interests and abilities to a degree. But the greatest difficulty has been in disentangling abilities and achievement. It is conceivable that abilities and interests are not related to each other, but that they both are related to achievement. So the problem of the relation of interests and abilities has taken on new form in the establishing of norms which are necessary for achievement in a certain field of interests.

So, too, the first problem of the permanence of interests has taken on new form. There is not a high degree of permanence of specific interests. Yet there is a genetic development of

interests, and interests appear to stabilize in certain fields of activities as training progresses. The problem of permanence is interrelated with all the problems of establishing interest measures.

The shift in emphasis is due to the development of interest measurement. The psychologist wishes now to know what is average, inferior, and superior development in the various fields of interests and to use this knowledge in the adjustment of the individual. The next two chapters are concerned with the *uses* of interest measurement.

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CHAPTER XI

THE INDIVIDUAL'S INTERESTS

Most of the work of studying the individual's interests has leaned toward the quantitative side, in the very reasonable attempt to secure some objective indices of interests. The significance of the chosen objects and activities, whether educational, vocational, or avocational, can only be determined by quantitative investigations of large numbers of persons. Prediction requires averages, distributions, and deviations; all of these necessitate the amassing of detailed information and its subsequent statistical treatment. But a method, however admirable, may fail of its result because of conditions which may disappear with further investigation or may never entirely cease to be important. At the present time the quantitative method of studying interests cannot give us all we need to know. It is possible that this situation will always continue and that after we have placed the individual in his proper statistical perspective we shall need to check our final conclusions by looking at the individual quite differently, taking a bird's eye glance at his entire genetic history.

The Study of the Individual. The qualitative approach to the study of the individual is coming more and more to be termed clinical. This carries with it a suggestion of abnormality which the future will quite possibly eliminate, except in the sense that all of us are abnormal, each of us deviating from any discoverable norm in some fashion or other. The clinical viewpoint in the study of personality is often contrasted with what has been termed the statistical viewpoint.[1] By the statistical viewpoint is meant the placing of the individual according to standards of measurement. In the extreme

[1] See article by Morris Viteles, "The Clinical Viewpoint in Vocational Selection," *J. of App. Psychol.*, 1925, IX, 131-138, in which the relative merits of these viewpoints in vocational guidance and personnel selection are set forth.

statement of this viewpoint, which is that followed only by the naïve counselor or personnel executive, the results of tests and standards of adjustment are used as exact measures of personality. A profile is made up from the test results and adjustment is attempted in a quantitative comparison of individual profiles and occupational profiles already prepared from job-analyses of the different occupations.

On the other hand, the clinical viewpoint aims to describe personality, along with the results of measurement, in a far more complete manner than is possible by standardized measures. The clinical viewpoint would include the general description of personality by a competent psychologist, in addition to all possible measurement.

The difference between the statistical viewpoint and the clinical viewpoint is primarily a matter of emphasis. But this difference in emphasis is important. The difference is in the reliance placed upon the psychological measures. The clinical viewpoint maintains that there is something psychologically lacking in the assembled scores secured from measurement, and that there is a contribution to be gained from the general observation of a person during the testing procedure and in the interview. The approved clinical procedure would make use of all that can be legitimately interpreted from measurement and add to it the results of general observation.

There has been a controversy for some time over the clinical and the statistical viewpoints in the measurement of abilities, with the statistical viewpoint giving way to the more human approach. Bronner, Healy, Lowe, and Shimberg [2] make clear that the uncritical diagnosis of abilities from tests, particularly upon narrow and simple psychological measurements, is not to be tolerated. In the study of the individual the utilization of a wide range of tests and measures is recommended. These authors do not think of mental testing as a routine task, or as the classification of individuals in standard terms. Mental testing is conceived as a part of the clinical procedure. The more tests used, the better the results and the better the understanding of the individual personality. Such studies are psy-

[2] See Chapters I and II in *A Manual of Individual Mental Tests and Testing*, Boston, 1927, 287 pp.

chological case studies in which mental testing is but a part of the clinical procedure.

These remarks were made with special reference to the understanding of the individual's abilities and disabilities. But they are even more pertinent to the study of interests because this measurement is much less clearly defined. Measures of interests will probably be developed so that a classification of individuals according to interests will be as feasible as a classification of individuals according to abilities is today. But tests and measures of interests, as in the field of abilities, must remain, it would seem, an aid in the clinical study of the individual.

THE STUDY OF THE INDIVIDUAL'S INTERESTS. The clinical study of the individual's interests involves two principal elements: (1) the diagnosis and prognosis from the ontogenetic history, and (2) the recommendations of retraining in the development of interests. These two problems are present, of course, in the clinical study of the total personality. Here we are concerned with them in the investigation of the individual's interests. The study of interests is one part of the psychological examination.

DIAGNOSIS AND PROGNOSIS FROM THE INTEREST HISTORY. To apply the term diagnosis to the study of interests would seem to go beyond the development of a technique for this purpose when methods in the field are compared with those of medicine and the measurement of other psychological qualities. Diagnosis refers to an understanding of the condition. What are the symptoms? The interest examination is concerned with a diagnosis of personality from this point of view by means of inventories, rating scales, and such tests as are available, supplemented by descriptive material of personal, school, industrial, and family history.

The prognosis, on the other hand, is a forecast of future development, based upon the diagnosis. In the measurement of abilities the I.Q. is a ratio by which the future can be predicted. This measure represents the dividing line between diagnosis and prognosis. In the measurement of interests, meaning is given to the scores by a comparison with scores of occupational and other groups. These are called norms of com-

parison. There is no exact line of demarcation between diagnosis and prognosis. Measures that permit with some validity an examination of interests, also make possible a similarly valid prognosis.

THE ORGANIZATION OF A CLINICAL STUDY OF INTERESTS. In the diagnosis and prognosis of the interests of a person under study the clinician is concerned with two factors:

1. The genetic interest history to date of present study
2. A cross-section clinical study of present interests by means of:
   a. "Own story" of interests secured in the interview
   b. Estimates or ratings by parents, by teachers, by employers, by friends
   c. Rating scale results
   d. Inventory results
   e. Objective test results

The cross-section study, of course, brings up to date the genetic interest history. From the facts gathered by these means, causative factors are understood and recommendations for training can be made. This clinical study of interests will be the subject matter of the chapter following. In this chapter we are concerned with the genetic background of interests which make up the life of the individual.

THE GENETIC INTEREST HISTORY. Ideally, the genetic interest history should be a part of the developmental record of the individual, from babyhood, throughout childhood and adolescence, into adulthood. Provided an interest history has been kept, the cross-section study is a process of bringing this record up to date. The interest history might be kept by the parent, who is in touch with all sources of information, but in all likelihood it will function best in the hands of the school counselor. However, few interest records are now kept by parents or counselors. We are just being educated to keep cumulative records of abilities. To add to this a record of interests is perhaps the next step in understanding the development of an individual.

In the usual work of the clinic today the genetic interest history is assembled at the same time as the cross-section study of present interests is made. By interview and ques-

tionnaire methods, past interests are recalled and pieced together into a genetic interest history. This record has but little of the authority of the record kept throughout the period of development, but a genetic history of interests is necessary to the understanding of interest trends, and it should be made out in the psychological examination of interests.

The genetic history would include a record of interests in all fields. These may be summarized for practical purposes under the headings of vocational, educational, and social. It should reach back into earliest memories and extend to the time of the present study.

THE CONTROLLED METHOD OF SECURING THE INTEREST HISTORY. The genetic history may be made a controlled retrospective study as a part of the interview or by means of the questionnaire. Such a method has been used by the author in investigating the interests of college students and in the vocational guidance of adults, and it has much of practical value to recommend it. The attention of the individual is centered upon definite developmental periods, for example: (1) earliest recollections, (2) entering school, (3) last years of elementary school, (4) last years of high school, (5) entering college, (6) graduation from college, (7) time of going to work, (8) after several years in occupational activities. These recollections should involve all fields of interests. The early ones would, of course, be purely social and activity interests.

To stimulate recollections of early school interests, a statement something like the following has been used in the interview or given as a part of the questionnaire in studying the interests of adults:

Think, for fifteen minutes, of the last two or three years in grammar school. Read this slowly as you do so. Think of the schoolroom, of your classmates, of your teachers. Think of the school yard and of the school teams. Think of the boys and the girls you liked best. Can you recall their names? Think of your chums. How high did you stand in your subjects in comparison with the others. Think of those whom teacher asked to clean the blackboards. Think of the times you were kept after school. What did you do with yourself during your leisure time? Think of those days in grammar school for a few minutes longer.

Then put down in the order of importance (after each of the main

headings below) those things you liked best during the days in grammar school. Don't hurry; take plenty of time to think it over before writing.

1. Work Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
2. Study Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
3. Play Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
4. Religious Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
5. Reading Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
6. Interests in People: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....
7. Any Other Interests: (1)..... (2)..... (3).....
   (4)..... (5)..... (6).....

A similar request would be made for each outstanding developmental period of the life of the individual and the results assembled as a genetic history. This method has been used in various forms by investigators of the development of interests. The statement would, of course, be adapted to the individual being studied. As presented, it was used in the study of adults of the college level. It would seem applicable to use with normal boys and girls as young as 14 years.

THE AUTOBIOGRAPHICAL METHOD. Retrospective study is a questionable source of information at best, even when controlled technique is used in the interview or questionnaire. But there is in the controlled method of securing the interest history just described a source of error. The genetic sequence of interests is broken up in directing the associations into certain fields of activities and within definite periods of development. There is a place in the study of interests, it would seem, for the autobiographical method which allows for the interests to be recalled in the normal manner. This method has been found to be useful in the study of the interests of adults with superior mentality and training. It is suggestive in the diagnosis of interest development and perhaps of greater value in

informing the individual of his own interest development.

In the autobiographical method the subject being studied is asked to write his interest history, indicating the high spots in the development of his interests. He is asked to tell them—not to explain or justify them, or give reasons why he followed or did not follow them. In the use of this method instructions are given somewhat as follows:

I want you to write an autobiography of your life interests. Do this leisurely. Spend several days in thinking about what you were most interested in doing as a boy or girl, and then on throughout your childhood until you became a man or woman. Try to recall the earliest things which you liked or disliked. These may be such things as building mud-pies or peeling potatoes. Start with these earliest interests, in writing your interest history. Don't confuse the things you did well with the things you liked best. Tell only of the activities, people, and things you liked best or disliked. Recall all of your vocational, educational, and social interests from earliest time. Mention the personality interests that came into your life. Remember, write only about those things which you liked or disliked from earliest days to the present. You should take about a week to do this, making notes when you think of interests to be included in your autobiography.

Some Genetic Interest Histories and Their Suggestions. The genetic interest history was early suggested by G. Stanley Hall and used by Elmer Clark in 1917 in a study of "Factors in Vocational Determination."[3] Clark asked his subjects to "write out very freely, and in as great detail as possible the whole course of your vocational ideas from childhood to the present time." He gave further verbal suggestions similar to those above, to assist the subject in writing the interest history. The following subject (Subject 16) shows an orderly development of interests, with the exception of the baseball phase, which grew out of hero worship, and of farming, which was an economic problem.

Subject 16: Male, Education: A.B., Age, About Twenty-five Years

1. As a boy I was always interested in my school work and I was grieved when the summer vacation came. I remember distinctly as early as ten years I thought I should like to become a teacher. Just

[3] A master's thesis in the Clark University Library.

a few years later, a first cousin of my mother was made president of a college not so far from my home. He had been born and raised near my home and had recently taken his Ph.D. degree at Virginia. He now became the ideal of my day-dreaming as to my career. I thought to myself that some day I would become a teacher in some college, and perhaps a college president. My earliest ambitions did not go so far as I had merely thought to be a teacher in public schools would satisfy me. In all these ambitious dreams I figured as a man whom everybody reverenced and who stood out as a unique and prominent character.

2. At about the age of 13 or 14 I became much interested in baseball and decided that some day I would like to play with the major leagues. I read much concerning the games and the results of the championship series. This was while the Cubs were champions for five or six years and Johnny Evers, second baseman, was the hero, and I promised myself that likely in some future day I would be some shining star at second.

3. About this time my interest in school and in teaching was still alive and I noticed keenly the affairs at the college of the aforesaid college president. This school is a religiously controlled institution, and a good many young ministers attend there. Occasionally one of them came to my community to preach and quite frequently to my home. I began to heroize one of them in particular, and I decided to prepare to preach. This ambition was not as prominent in my life as some others or indeed as most others, but this young man, I think, caused me to want to be like him.

4. Another very important feature of my hopes was the desire to become a lawyer. This ambition was one of prevailing influence for several years. I thought I should like to practice awhile and later go to State Assembly and finally I pictured myself a member of the lower house of Congress. I also had an ambition to become a member of the President's cabinet, particularly Secretary of State. But I never had much desire to be President, strange as it appears. Through history I had associated Secretary of State with the Prime Minister of England and "Bismarck" of Germany, and I had a big ambition for such an influence as Bismarck. This dream never approached reality very much, for I never did very much public work. In high school I debated some, but when I came to try out some of my dreams it seemed that they lost some of their charm.

5. When I was nearly 16 my father died, and the proposition of remaining on the farm was put up to me. In my childhood I had never liked the farm much, nor did I have any inclination to farm. But when the actual proposition came, the promise of good and definite remuneration from a good and fertile 170-acre farm was quite a proposition to turn down. Even after I was in college I contemplated returning to the farm. But farming was never much factor in my day

dreams. It was always a matter of more serious contemplation. Whether I owed it to my mother, or to the welfare of my sisters and myself as well, to keep to the old farm was question of grave moment.

6. In a final decision of a calling nothing definite is reached excepting that I anticipate some phase of education. In college I thought quite much of becoming an educational missionary to China or India and the idea is still in my repertoire of thoughts. I was brought up in an orthodox environment and my inclinations seem to tend towards religious work quite as much as my age advances. Missionaries on furloughs have spoken to me several times of the need of them and the greatness of the work where they are, and this problem is one which faces me at present. I have decided to go into the field of education either here or abroad.

The classification of interests here is into periods of development. From the age of ten it will be noted that the interest in teaching continued to maturity. The influence of the example of the cousin who was a college president, plus the religious influence of the home, attached importance to the calling of the minister. The desire to be a lawyer stayed in the day-dream, while the question of farming never intruded in the day-dream, or certainly very little. Law and politics made some of the same appeals as did teaching, preaching, and college presidencies. Religion comes in again to emphasize the attractions of a career as a missionary, the educational interest requires that he think of himself as an educational missionary. This subject's vocational interests may be listed as follows:

Teaching	Foreign Missions
Administration in college	Farming
Ministry	Baseball
Law	

Another subject, whose vocational interests were studied by Elmer Clark, may serve to illustrate the use of his method.

SUBJECT 17: MALE, EDUCATION: A.B., AGE, ABOUT TWENTY-FIVE YEARS

Considered from the point of view of my vocational interests, my life may be roughly divided into five periods. Of course, as a rule, there was no sudden transition from one period to another. These periods are:

1. The period covering my life until about my eleventh year. This

is very indistinct. The one ambition that I remember was to be President of the United States; nor did this then seem to me in any way impossible. I lived far out in the country; so I saw very little of policemen and firemen, and nothing of soldiers; and I can recall no ambitions in any of these directions.

2. About this time I began to be troubled with the feeling that I should be a preacher. I say "troubled," because the feeling was unpleasant; I still at times think of entering politics and rising to the position of President. The diplomatic service also attracted my attention; and I had pictures of myself, in gilt braid, the representative of my government, attending receptions in London or some other foreign capital. At times, there was also the thought of staying at home and being a farmer. But the thought that I ought to be a preacher sometimes almost haunted me; such a life was distasteful to me because it meant the giving up of my other ambitions.

3. Probably during my fourteenth or fifteenth year, thoughts of being a preacher bothered me less and less. Finally the feeling that I "ought" left me entirely, and I was much relieved to think that the ministry was not my life-work. None of my family knew of this thought; it was assumed that after I had gotten a college education, I should return to the farm and carry on my father's work, and as I have always liked farm work and farm life, this appealed to me, and I tacitly agreed to it. This state of mind lasted through my first year in college, or until I was a little over 17.

4. In October of my second college year, I attended a Y.M.C.A. convention, where I heard several addresses on foreign missions as a life work. This started me to thinking about foreign mission work; about this time, also, of finding a life-work where I could serve most and best, and not where I could get the most for myself. During the next two years, I attended several conferences, Y.M.C.A., Laymen's Missionary, and the like, and heard many talks on foreign mission work. During this time, I don't think a day passed that I did not think of my life work, from one angle or another. It was, for the most part, a question of whether I should go back to the farm, or be a foreign missionary; and the second part of the question was formulated in my mind as follows: Why should I not be a foreign missionary? At times, also, I thought of the service I might render as a college professor. During these two years, I did well in my theme-work in English, and wrote a good deal for the college magazine; and I thought a few times of a literary life, with nothing to do but write, and could see my name in print on the front of some volume; I was to live on my "country estate," where, somehow all the work was to be done without any care from me, while I was to have my whole time for writing. These thoughts, however, were distinctly secondary, more infrequent, and more quickly put aside as being unworthy a man who would lead a life of service.

5. The month after I was nineteen, I became a student volunteer, definitely deciding for foreign missions as my life work. The decision was made under stress of no emotional appeal, but was calmly thought out and decided upon the basis of the largest possible service. Since that time this has been the dominating idea of my life. I have thought of literary work, but the idea was that if such work were done, it would be entirely secondary.

Clark appends the following remark to this case history: "In one of the conversations with the writer of this history, a graduate student and a man of well-poised seriousness, I noticed a slight but distinct element of uncertainty as to his becoming a missionary."

Vocational interests given here show again the ingenuity with which several early interests unite to indicate a final choice which might not have been made, had any of the earlier ones been lacking. After the adolescent yearning to be president, which passed early, came the important mixture of feeling about the ministry. Outside this line of development was the farming interest, which was strong and reasonable in the circumstances, but which offered no outlet apparently for the yearning to be of service. The continuance of the man's education exposed him to further appeals, particularly to that of foreign missions. An interest in writing developed, but, like farming, this did not answer the needs the boy had felt in his early struggles against the "oughtness" of being a minister.

A Study of the Vocational Interest Histories of High-Average Girls. The writer used the autobiographical method in 1922 in an investigation of the vocational interests of a special group of adolescent girls engaged in the study of domestic science. Five of these subjects' interest histories are given below to illustrate the use of the method with a high-average intelligence group, who have advanced to the level of a high school education. A summary of the interests of the subject precedes each history.

Subject 18: Female; High School Graduate; Army Alpha Score, 112; Age, 20

Interest History Summary

1. Age 7-10 years: Played with boys; wished to be President of the United States.

2. Primary grades to third year high school: Nurse. Developed by playing with dolls; strengthened by being sent to hospital; ended on refusal of parents.

3. Primary grades to present, but emphasized after giving up nurse ambition: Artist (painting and drawing). Temporarily put to one side.

4. Present: Cooking and marriage, after which to return to art work.

Interest Autobiography

It is a very difficult thing to span the Bridge of Life and look into the past, the days of childhood, carefree and happy days, where one built his castles and reveled in them, little knowing and guessing how much Dame Fortune would alter them.

As a child, my sole companions were boys. I reveled in their games and pranks and did not enjoy being sedate and playing feminine games; as we'd sit and talk they would reveal their ideals and thoughts. Some wanted to be president of the United States, others civil engineers, etc.; my childish heart was filled with the ambition to be president of the United States, until one day I heard that a woman would never be president, then Castle No. 1 crumbled.

As I advanced in the primary grades, I slowly fell away from my male companions and took to dolls. I enjoyed treating them for sickness, bandaging their wounds and breaks, and the thought came to me, it would be wonderful to be a nurse to help the sick, relieve them of their pain and suffering, offering them helping hands in their weakness, and after sharing this thought for some time, I was taken to the hospital where I remained for over a month, becoming more acquainted with a nurse's life and their duties. I just longed for their life; all my thoughts centered around the hospital and the sick. When I finished my sophomore year at high, I revealed my thoughts to my parents; here I met with opposition and they refused to give their consent to my entering. Hence, Castle No. 2 went with Castle No. 1 into the past.

All through grammar school, and my freshman year in high, my teachers tried to influence me to turn my mind toward painting and drawing as they thought I was gifted. When I gave up all idea of becoming a nurse, I put my whole heart and soul into painting. I visited galleries and museums, went sketching and dreamed I was over in Rome and France, walking through the galleries admiring the paintings of the old masters and I longed to be famous, a Raphael, etc.; this I knew was my vocation, a calling that I had all the time but failed to heed, but to be famous like the old masters, it would take years of toil, hard study, hardship, and trials, but this was my calling, my one castle that did not crumble and become a thing of the past, but I first had to put it aside with hopes that a time will come when I can take it out and build on it again.

But for secondary matters. I liked to cook and the old adage, "the

way to a man's heart is through his stomach," inspired me to take up domestic science, as all girls' ambitions, or one of them, is to be married some day. I decided to take up domestic science, this to use for a few years and then perhaps some day, I will turn back to my true vocation, that of an artist.

SUBJECT 19: FEMALE; HIGH SCHOOL GRADUATE; ARMY ALPHA SCORE, 121; AGE, 23

Interest History Summary

1. Before seven: Draw and color pictures. This continued in school work.
2. First year in school, age 7: Teacher.
3. Drawing developed into sewing during P. S.
4. High School graduation: Teacher.

Interest Autobiography

My first ambition and chief delight was to draw and color pictures, or to color the pictures in books and cut them out for paper dolls, which oftentimes meant the destruction of my mother's latest magazines. Although material suitable for this play was always furnished me, I one time tried decorating the wall paper in the front hall, which was plain, and together with the large space and flat surface made an excellent canvas, but to my dismay, when it was discovered, I only wished I had used my drawing books and writing pads instead. This was before starting to school.

At seven years I entered school and at once became very fond of my teacher. As children usually imitate their elders, I was only one of the many and not only tried to imitate her methods of conducting classes when I went home, but while in school would sit and try my artistic ability on drawings, such as they were, of "Teacher," together with my actions which were, such as trying to look stern and dignified, doing my best to acquire these characteristics which I thought, of course, belonged to and made up every one worthy of the name "teacher." But one afternoon when she discovered the rough sketches in the back of a book and noticed my actions of imitation which were just then furnishing amusement for those about me, she administered a ruler to my hands, which drove from me like a fleeting breath all my hopes of ever drawing again and above all of entering the teaching profession, for my love of teachers was quite crushed and injured.

But the desire to draw and to make paper dolls was soon revived and when not allowed to do so in school, I would spend the recess periods in this way. As I grew older I wanted real dresses for dolls and gradually began to make them, which were indeed the most shapeless and crude productions possible, but from the crude beginning developed the ability as time went on, to sew. Probably due to my in-

terest in sewing, I particularly noticed the clothing of my playmates. There was a girl sitting ahead of me, who very often wore a dress which was of a very closely adhering type. Through the center of the back was a seam on which a great deal of stress was exerted, especially when she drew her arms forward. It seemed to me that that stress ought to be relieved, so wishing to see the result of what would happen, I borrowed a knife from a boy near me and gently applied the sharp blade to a stitch in that seam directly between the shoulders. At once there was a response to that stimulus as can easily be imagined. The response came more ways than one, for I believe I suffered more than the girl or her dress.

Even though I continued to draw and sew, my ambition to become great was not being realized fast enough, but I learned that great things aren't done nor high ideals realized in a day, so slowly plodded on.

But the desire to teach never returned until I had finished high school; then that hope came flooding back, and after preparation the aim was realized, and engaged in for some time.

SUBJECT 20: FEMALE; EDUCATION, VOCATIONAL SCHOOL GRADUATE; ARMY ALPHA SCORE, 78; AGE, 22

Interest History Summary

1. Age 8-10 (5th grade): Teacher. Ambition has continued since.
2. Teaching idea became gradually directed towards the domestic sciences. This ambition was consistently developed.

Interest Autobiography

At the age between eight and ten, then a student in the fifth or sixth grade, my aim for teaching started. A little later I imagined it was just child fancy to imitate the teacher, that would die down after a period of time. It did not die down, however, and I still craved to be a teacher when I grew up. My thoughts to teach were ever directed toward the sciences of the home, as a Cooking or Sewing Teacher, never any other kind. Mixing a cake, or making a garment, was my greatest enjoyment. This is due to the wonderful training I had secured under the supervision of mother. Whether or not I would ever prepare to teach was unknown.

After graduating from grammar school I could not be persuaded to enter high school, so finally father consented and arranged to have me enter the Household Arts Course at the —— Vocational School. This had been my wish and I was real happy.

The school at the time offered a two- and a four-year home-making course, under very competent teachers. The majority in my class were graduating in two years, so I decided to finish my course also. In the two years I had acquired a great deal of fine knowledge that never would be a burden to me.

After graduating, I turned my attention to the home, relieving a good deal of the household cares from mother's shoulders, in the line of cooking and sewing. This work I enjoyed immensely. I could experiment, and try whatever I wished, learning more all the time. This work I continued for four years, and about then got restless, desiring a change, either to get out and work, or continue my schooling. I was persuaded by my parents, friends, and former teachers, to go back to school for two more years, thus completing the four-year course. This plan I agreed to.

During the fourth year, I was given the opportunity to teach during the illness of teachers, in the sewing and cooking classes. I also conducted a cooking class, one afternoon weekly for school children, at the —— Memorial.

The work offered me in both of these classes brought out my ardent desire for teaching, and I enjoyed working among the children.

So upon graduating, I secured catalogues from the different colleges to see what they offered in the domestic science line. A great many of the courses were four years, and this time I was not anxious to put in. However, I had considered the three-year State normal course offered in this line. While glancing over schools and colleges advertised in some of the best magazines, I came upon the two-year course offered at the —— Domestic Science School. I felt it must be just what I wanted. The catalogue seemed to state it a very fine, hard and thorough course. This being just the thing, appealed to me greatly, and my mind was set on this school. Arrangements were made, and I arrived here. But, from experience, one of the two years' course is plenty for me.

SUBJECT 21: FEMALE; EDUCATION, COLLEGE—ONE YEAR; ARMY ALPHA SCORE, 118; AGE, 24

Interest History Summary

1. Age eight through high school into business college: To be private secretary to "noted man."
2. After business college: Missionary.
3. Immediately following: House work (always interested in it).
4. After one year in college: Domestic Science teacher.

Interest Autobiography

At the age of eight, our ideas and ideals are always wonderful. We are able to conquer the world in our minds.

I know my main ambition was to become private secretary to some very noted person and to have people say that I was private secretary to Mr. ——. When I started in high school, I took business courses, and afterwards business college followed rather than college. While attending college, an event occurred in our town which changed

my ideas and that was, the marriage of one of our church girls to a missionary in Africa. After hearing him talk, I decided that to become a missionary was what I wanted to become.

As my health failed and I had to stay home, my ambition diminished and I was soon contented helping home and in church until someone began asking me why I didn't go to college—that I was wasting my opportunities, etc., and so I decided to try college.

My work last year in college was interesting and inspiring. We heard many wonderful people who talked on opportunities of college girls until one didn't know what one wanted to become, until I heard a speaker on the great need of domestic science teachers. As I have always been interested in that work I decided that at last I knew what I really wished to become and so I came here. I think it is the most interesting work, and hope I shall make a success.

SUBJECT 22: FEMALE; EDUCATION, HIGH SCHOOL GRADUATE; ARMY ALPHA, 91; AGE, 18

Interest History Summary

1. In 4th grade: Teacher, because teachers know so much and "have so much authority."
2. First year High School: Biology and medicine.
3. Always fond of cooking and sewing. Satisfied with decision to teach domestic science in a large high school.

Interest Autobiography

I was in the third grade when eight years of age. My teacher at that time was very strict and cross. I believe her greatest pleasure was slapping you if you failed in a problem, etc. My greatest ambition then was to master arithmetic so teacher wouldn't slap me quite so often.

In the fourth grade after problems, simple problems, were understood, I thought that I certainly would like to be a teacher. Teachers always knew so much and they seemed to have so much authority, and I always did sort of like to rule over others. After I had gone through the sixth, seventh, and eighth grades, well, I decided I never would want to be a teacher. Reasons best kept to myself. During these four years I was having a good time, and gave little thought to my future work.

When I entered high school my parents informed me that I had to do some good hard studying. In my freshman year I took up biology, a subject that was intensely interesting to me and later interested me so far as to consider the matter of studying medicine. I realized that to take a course of this kind meant seven or eight years of intense study. Being fond of good times, I dispensed with the idea of ever

becoming a physician, but sometimes I seem to have a great longing for it.

When I graduated I had no idea whatsoever of what work I would specialize in. I was going to college, but where, and what for, I did not know. I applied at this and that college. Accepted in one and rejected in another on account of lack of one college required subject. I intended to attend college only one year and then perhaps at the end I would have come to the conclusion of what I would make my life work.

I had always been fond of cooking and sewing. My one-year course has taught me lots, and now I am glad that I decided to make it my work. For the next three or four years I will be faithfully pursuing domestic science, my highest ambition being to teach it in a large high school in the city from which I come. So, you see, I have not wanted and thought about many things that I could take up.

These vocational interest histories are of girls in their early twenties who are of high average intelligence, with a high school education. They are all studies in a specialized vocational field. One wonders as one reads these histories if there is not included some rationalization of the facts, perhaps a great deal. But they ring true to a degree. Their greatest lack lies in the limited recall of interests. This may, of course, be an indication of the absence of interests in the individual. It would seem that here is a dividing line in the use of the autobiographical method to secure the interest history, that is, at the level of high average intelligence and a high school education. It is probable that the controlled method of securing the interest history, which stimulates recall of interests to a greater degree, may be used at lower levels of education and intelligence.

A Study of the Interest Histories of Superior Adults. Two interest autobiographies from a study of interests of superior people were given in Chapter I, to illustrate the detailed nature as well as the genetic development of interests. This investigation was not limited to vocational interests. It is a study of professional people, largely in the field of teaching. The qualitative nature of interests is well illustrated. Here the autobiographical method is at its best, where the subject is trained in intellectual honesty and has had practice in writing.

The first subject in this study of the interests of superior adults (Subject 23) has outlined very completely his interest development. There are numerous scientific and esthetic interests which were not followed. The intrinsic interests appear to have offered little motivation. "Difficulty" is an interest furnishing the stronger drive. This appears in the question of teaching and in the army. Nevertheless, while those sciences which early drew the interests of this man did not lead to a choice of a vocation, the work of observing, classifying, etc., which was involved in them, is the work required by his present position as a psychologist insofar as he engages in research. Even here, however, there is evident in the history of a lack of practical approach and a preference for the discussional aspects of the subject. In literature and music he has become an interested spectator rather than performer.

SUBJECT 23: MALE; EDUCATION, M.A.; AGE, 32 YEARS; UNMARRIED

I. To end of Grammar School (to age 14.9).

1. Meteorology. Interest began at age 13.5. From the first, observing and tabulating and treating statistically temperature and precipitation.

Vocational Significance: About age 14, some vague ideas of becoming a government observer. I recollect that once I sent for an outline of the civil service requirements therefor. These ideas never became, however, defined plans.

2. Astronomy. Interest began, I think, at about age 12. Reading, map-making, observations of stars and planets with field glasses.

Vocational Significance: Some early dreams of becoming an astronomer. Never became defined plans. Certainly very short-lived.

3. Music. Interest began, I think, at about age 12. Piano playing, some attempts at composition.

Vocational Significance: Very definite day-dreaming as to becoming a virtuoso. No constructive plans.

4. Literature. Used to write stories as early as age 8. Continued to do so through this early period.

Vocational Significance: I may have dreamed of becoming a writer. I am not sure.

5. Botany. Collecting, identifying, listing local flora. Interest primarily æsthetic, not scientific.

Vocational Significance: None that I know of in the above activities.

II. High School Period, age 15.2 to 18.9.

1. Meteorology. Interest continued very strong.

Vocational Significance: My memory fails me. I probably thought vaguely at times of becoming a meteorologist.

2. Astronomy. Interest declined, finally vanished almost entirely.

3. Music. Interest continued very strongly. I practiced regularly and with considerable application. Efforts at composition continued.

Vocational Significance: I thought much as to the possibility of becoming a pianist, but still only in day-dreaming fashion. The drive for my work on the piano was æsthetic, not clearly practical.

4. Literature. Interest strong, but no more story-writing. No further vocational significance.

5. Botany. Interest continued, but at about age 15 or thereabouts turned definitely to

6. Gardening. Unusual interest. Flower gardening and landscape planning mainly, some interest in truck gardening. Constructed myself rather extensive borders and flower beds, doing much manual labor and securing some very good results. I became acquainted even with the methods of experts in growing, not only nearly all the ordinary garden plants, but many rare and unusual ones besides. At one time I had as many as 150 varieties of herbaceous perennials, and 30 kinds of iris alone. I experimented, in a sense, with many varieties, trying them out once at least; e.g., I grew sweet potatoes in New England. Much reading in the general field.

Vocational Significance: Beginning at about age 17 I sold locally a few vegetables and flowering plants. Yet my interest was in the main æsthetic and in a sense scientific; in these respects it seems to me to have been wholly mature. I do not recall that in this period I ever planned to be a gardener.

7. Entomology. Began at about age 16. Collecting, analysing, classifying, mounting, preserving, cataloguing, etc., butterflies and moths; raising them from their larvæ. Very extensive and intensive interest.

Vocational Significance: I do not recall in this period any serious interest other than æsthetic. Yet at the end thereof, at about age 19.0, I was persuaded by the hints and suggestions of a teacher of biology and of a family friend that I might well major in biology in college. Hence biology may be said to have been my first vocational interest of any constructive definiteness.

8. Geology. Interest began at about age 14, I think. Confined to collection, classification, preservation of mineral specimens. Almost wholly æsthetic.

Vocational Significance: None that I know of. I think I used to envy the paid collectors of minerals in the remote corners of the earth; I am not sure.

Summary. Note the diversified æsthetic and semi-scientific interests. The trend of the latter towards collection, classification, tabulation. The lack of any practical, economically motivated interests. (Other interests were stamp-collecting, reading novels, history, etc.)

III. College Period, age 19.2 to 22.9.

1. Meteorology. Interest continued without change in strength.

Vocational Significance: I think the ideas of becoming a government observer finally failed entirely. Why, I don't know. I did not take the courses in the subject given in college. My interest was only observational, never analytical or causal, or in any way practical.

3. Music. Interest continued even more strongly. Practiced for years, four hours or so a day.

Vocational Significance: I definitely gave up any ideas of becoming a pianist (or a composer). Reasons: Recognition of my incapacity to acquire the necessary technique (this accentuated by a permanently effective injury to a finger at age 22). I had (or seem now to have had) more enthusiasm and real drive for musical work than I have ever had in anything else. Yet even in these college years I never seemed to care for it in a practical light; I never, e.g., tried to get a job playing for dances. Still, the dream of the virtuoso was to me dramatically satisfying, and I think I can say that had my technical facility permitted I should have become a musician.

6. Gardening. Interest continued quite as strong throughout college.

Vocational Significance: Apparently none. I even refused to work as a gardener in a neighboring estate. I did not seem to care about applying myself to the labor of earning money in any field, no matter how much that field might appeal to me in almost all other ways. Still, some slight sale of vegetables and plants continued (but I got more pleasure in giving them away).

7. Entomology. Interest continued, but by end of college, age 22, had begun to decline.

Vocational Significance: I collected insects for —— University during vacation of Junior-Senior year, age 22. Although I majored in biology, I definitely decided against taking it up as a profession. Causes: I had no analytical or causal interest, but rather an æsthetic and adventurous one. It was the collecting, the roaming about in quest of new and unforeseen, which interested me. I found the biologist was a man of the æsthetically offensive laboratory, not of the beautiful out-of-doors (as I re-

garded the latter), of dry bones and not of living nature. In a different environment I think I might have become a field naturalist.

8. Psychology. I had no interest in this field, but mention it here only because the professor thereof secured for me during the last half of the senior year the position of quiz section assistant. I was vocationally employed, but without, so far as I can recall, any special interest in that vocation.

Summary. At the end of college I am quite without vocational interests. Various day-dreams have been exploded, some interests lost. I have no interest in earning a living or in achieving any sort of success which I think is possible for me. I will take anything that turns up.

IV. End of College to End of War, ages 23.2 to 27.2.

3. Music. Interest continued, but no practice.

Vocational Significance: At age 24 I tried (feebly) to get a job as pianist in a movie theatre but failed. This effort did not, however, represent any real vocational interest, but was motivated solely by the sense that I must work at something.

6. Gardening. Interest vanished almost entirely when I left home at age 23.

Vocational Significance: Worked part time as gardener on neighboring estate, age 23. Motivation: I had been accepted as officer in army; wanted to get money for uniform and necessary travel. Also, I think that at this age, for the first time, some sense of what we call serious responsibility began to develop.

8. Psychology. Interest doubtful, not more than slight anyway.

Vocational Significance: Research assistant, working with feeble-minded, one academic year, age 23-24. Reason for going: not interest, not personal planning, but suggestion from professor of Psychology at —— University; I took it because I must do something and had no definite practical interest in anything. After leaving I made some half-hearted attempts to get a position as university assistant in Psychology, or as mental tester in an institution, but failed. Even writing articles while at —— did not stimulate me to any "drive."

9. English and German. No special interest, but—

Vocational Significance: I chanced to inform the respective professors at —— University of my not having a job, and was offered and accepted a position as instructor in these two subjects. Miserable pay, disciplinary difficulties, a most unhappy year. The war came as a welcome relief. But out of this developed an interest in teaching. I think I felt that I had failed as a teacher, yet that feeling seems to me now to have stimulated me to consider success therein as worth-while. Age when teaching—24.

10. Army Officer, artillery, age 25-27. No real interest, except that the duties of an officer, being difficult for me, seemed to me to be (like teaching) something necessary to conquer.

Vocational Significance: I at one time resolved to remain in the Army. Causes for giving up the plan: Certainty of my unfitness for the Army environment and for the duties of the officer, of my lack of the necessary sort of personality.

V. End of War to Present, ages 27-32.

6. Gardening. Worked as gardener, full time, entire summer, age 28. Causes: No real interest, but now I had a complete realization of the necessity of my laboring at something always.

8. Psychology. While I was still in the Army, age nearly 27, I definitely decided to become both a psychologist and a teacher. I am not sure why. Interpretatively (rather than descriptively) I should say: (1) I was sick of the Army, anything looked better to me than that; (2) I felt that from a practical viewpoint I was already (by accident) better prepared to go on with psychology than with anything else; (3) Everyone had always told me that I should be a teacher, that the environment to which I was suited was academic. I felt that I had thus far failed at it. But in some way success in teaching came to symbolize success as a personality and so became a clearly defined goal (with emotional reenforcements).

Since this time I have scarcely even considered any vocational change. An M.A. from —— was followed by 4 years' instructing at —— then by a year at —— University. It is my present supposition that I shall continue in psychology always. I have no plans of any sort by which this profession could be supplanted by any other. I am not sure I am happy in it, but I know that I must work and that changes cannot be made at the advanced age of 32.

The interest histories often show a rather dominant vocational interest which drops out completely, such as the gardening interest of Subject 23. Often parents and counselors are greatly concerned over adolescent interests which are entirely impractical but which seem to dominate the life of the individual. The environment has a checking influence upon the practicality of interests. Other interests, as they develop, often interfere or check an earlier dominant interest. The genetic development of interests is, it would seem, a checking and balancing off of interests as life unfolds.

The next subject has written her interest autobiography in narrative and in different form to the one above, yet showing

the genetic sequence of interests. Both she and her brother agree that the influence of their father stands out in all their memories of early interests.

SUBJECT 24: FEMALE; EDUCATION, PH.D.; AGE, ABOUT 40 YEARS; MARRIED

My father was a clergyman whose health was poor. His main interest in life was his family of five children, four boys and a girl, with eight years difference between the ages of the oldest and youngest. Our education was broken and informal up through the grades, so much so that I have no recollection of the transitions. At home our drill in spelling and mathematics was unrelaxing, and there was much conversation about history and geography. The focus was constantly on college preparation. We all knew that we were to go to college, that we were to have some help from small legacies, and that the rest depended on ourselves. We had to succeed. Failure was brushed aside as the one thing our father refused to think of. If we worked hard, we would succeed, and that was all there was to it. It was a simple teaching. Around it our education centered.

My brother and I entered college together. His interest in language, on which his vocation rests, seems to have emerged earlier than my own interest. I was his equal in mathematics, and although I did not know it then, I think now that I had more ability in mathematics than any member of the family. I developed a literary interest in language, but did not keep up the syntax side. My interest in history and geography, in which I was no better student than my brothers, seems to have had a deeper rooting.

No analysis and recall of that period, through grammar school and into the high school, makes it possible for me to separate myself in my thought life and vocational interests, from the life of these brothers and my father. In the meantime I had gone through the emotional experiences of adolescence, had developed interests in boys and clothes, pouted and stormed when I did not get my way as to parties and "extra-curricular activities"; but I had never rebelled against a training which in its ideals was founded on the old public schools of England. The three of us were so drilled in Latin grammar that we knew it by paragraphs.

Teaching was the only vocation ever spoken of as a possibility for me. I taught my younger brothers as they came on, and it did not seem to me to present any difficulties; one "just taught." As I never worked through pedagogy until I was far along as a graduate student, I kept this simple and naïve attitude toward teaching until very late in life.

We all had excellent memories, and, I think, traded on them for a good many years before our judgments ripened. The family connec-

tion was rather inclined to be amused by our recitatives. The exercise inclined some of us to public speaking; it is now a part of the stock in trade of three of the five of us. My special performances were with long historical poems and narratives. In addition to our own stock we had that of a favorite aunt, who used to spin for us yarns which were continued over days and even weeks. If we had not had literally beaten into us a rigid regard for truth in the most puritanical sense of the word, these exercises might easily have made all of us to lose sight of reality. As it was, I have to this day a childish fright at veering from the "truth," which I shall never overcome.

I hope I have made it plain that up to the time I went to college my life had been a group life. With such skill as my study of psychology has given me I have gone over the memories of my girlhood, only to find that a sense of being a distinct individual emerged very late. I was one of a little group of children with the same interests. The intensity of the effort to get the kind of education that our father wanted us to have seems to have kept other interests in the background. Undoubtedly they were there. I loved clothes, and had my vanity stirred by the attention of boys, but books and new knowledge came first. Probably that was because it was what I constantly heard, in my own home and that of both of my grandfathers' homes. In one of the latter I heard a great deal of political discussion; in the other so much liberal religious argumentation that I began very early to generalize religion into something fundamental but rather vague. My sharp curiosities never seem to have gone very far in that direction. I was much more concerned about the world in which I lived.

In accordance with the southern tradition, I married early. This was the crisis which made me a person, no longer a dreamy, booky, simple-minded girl, but a woman with the struggle for individuation on her. It took me ten years to come through. But when I did come through, I was hardened into what I had started to be as a child, one whose first interest would always be in thinking. I taught, but teaching was still first of all concerned with telling others something interesting. I was still concerned that what I told should be true; so I am a research worker concerned with methods of testing truth. I still am a member of a group, and so I am a social scientist. What I do is still secondary to what I think. I want to use such knowledge as I get, but it is no longer for my brothers; it is for the group of women who have the struggle to make which I made.

Certain personalities stand out as influencing my development, but it is hard to say whether they influenced me vocationally. I am not sure that they did. They answered for me unanswered questions over which I had pondered. From the time when as a college sophomore I heard John R. Commons and James H. Hamilton lecture, I knew that I preferred the field of the social sciences. In order to keep my

history and language and at the same time take up these new subjects, I dropped my mathematics. This was a mistake, and I have since tried to see how a curriculum for the undergraduate could be planned which would not make such a choice necessary.

Professor Hamilton had told me when I was a junior that I must plan to do work with Franklin H. Giddings. My study of Giddings's social theory, begun as an undergraduate, continued and shaped my sociological thinking from then until now.

It was my work with Professor James Harvey Robinson which first showed me my woeful lack of knowledge of psychology. I began reading in the new field in the pre-war years, and attended the open seminars of Professor Thorndike's students. When I got in over my head in an attempt to study social taboos, my rescue came by way of psychology.

It is difficult for me to talk of the influence of Dr. G. Stanley Hall on my work, my thought, and my whole life. My delayed development began to exact its penalty in my late thirties. If Dr. Hall had not been there as my wise counselor and friend, I should probably have gone under. There were whole fields of knowledge into which I had never ventured, and which I needed for my next step, personal, intellectual, and mental. Then I had never up to that time led the life of a graduate student. While persisting in study, I had been something of a dilettante. He took me into that simple, companionable, exacting, and hard-working group which he had about him. I owe the best friends of my maturity to him. He was a great teacher, a wise guide. That I am only one of many whom he has touched for healing and awakening, cannot lessen the debt I owe him.

In this interest history we find no mention of interests outside the intellectual field, but a number of interests concerned with "thinking." Influence of the father seems dominant in determining early studies and probably the final vocation; influence of certain professors of special distinction is stressed as determiners of particular fields of work. Development appears to have been consistent within this one large definite channel of intellectual interests, which may be grouped as follows:

Scientific	*Linguistic*	*Remedial*	*Esthetic*
mathematics	Latin	charity	some study
history	recitations	work	of art and
geography	books		archæology
economics			
sociology			
psychology			

This is a limited list of interests. It is possible that it should include more of the activities imposed by the family theory of education, but there is little evidence that many of these subjects are definite interests. Other personalities than the father seem to have determined the development of interests. This raises the question whether, when the requisite ability is present, external forces may not satisfactorily shape the development of the individual when, as in this case, there is no feeling of coercion to develop into a rebellion which would be expressed in personality difficulties.

Subject 25 shows a more continuous, single interest than is revealed by the other histories. Writing as an "idea" is dominant throughout, although there are other interests.

SUBJECT 25: FEMALE; EDUCATION, PH.D.; AGE, ABOUT 30 YEARS; MARRIED

My earliest vocational interest was the same as my present one—writing. This does not mean that there have not been others from time to time. The strongest secondary interest was in acting, and this returns now and then in moments of revery and was very strong during the years of early maturity. These were both distinctly vocational interests. Avocational interests have included practically every field which made much demand upon the intelligence, and I took a Ph.D. more or less by accident in sociology and psychology, with little intention of using this. I merely liked to learn "interesting" things. English and languages which I found easy did not draw me as school subjects as much as the social sciences. Pedagogy I abhorred and I always swore I would never teach. Of course, with a Ph.D. and nothing else I inevitably drifted into teaching as the easiest way to make a living, but repetition of subject-matter bored me as did the mental reactions of the dull students, while my feeling for drama made me try to put on a good show for the students. If I had seen a good chance of getting into graduate teaching I should have probably kept to the teaching, but a casual glance at the ratio of women to men in such work would discourage any except the most ardent teacher. While teaching I was, as always, playing with my writing; occasional acceptances encouraged me and I floated rather casually out of teaching and into writing as a means of livelihood. I like to write almost anything about any subject. Reading and watching the antics of human beings are my chief diversions. The theatre continues to enthrall me, and I have aspirations as a playwright. Up to the present I have done nothing except one-act plays for amateur groups. External pressure is along the line of writing articles of semi-scientific

cast and books on various topics of interest to intellectuals. My first novel was begun at about the age of ten.

Minor Vocational Aspirations—to be a lawyer or statesman, in order to make public speeches and sway multitudes; to be a chemist because my chemistry professor had such nice eyes; to be an astronomer because women were not represented here (some of this feeling applied also to chemistry as I was a moderately violent feminist); to be a violinist (because I was put to study this and felt the exhibitionist urge whenever I went to a concert). No real drive on any of these.

Jobs—stenography for government, helping to win the war; teaching psychology and sociology, research in both fields. None of my jobs have been actively tied up with fundamental interests. I drifted in and out of them, according to circumstance and the urging of friends. While in them they all were moderately interesting, but I never took them with appropriate seriousness as "a life-work."

Vocational Influences—Writing was stimulated by my mother's interest in literature, her wish that she had been a writer, and early attention on juvenile compositions. Several other members of the family wanted to write or did write a little, and I was somewhat motivated to excel the others. The dramatic urge came from early, impassioned attendance on the theatre and was increased by college dramatics. Now I like to play with Little Theatre activities, and am inclined to think directing would be of more permanent appeal than acting. It would seem to be significant that acting without the glamour of conspicuous success would not, I am sure, hold me at the job, while I prefer the life of a writer, with however meagre returns, to any other. This is partly due, no doubt, to my rebellion against the masculine world and the restrictions on women's activities. In writing, I am pretty largely free, and I feel no handicap in being a woman. The primary reason, however, seems to be satisfaction in the work itself.

The interests of this subject may be grouped, as follows:

Scientific	*Esthetic*	*Miscellaneous*
chemistry	writing	lawyer
psychology	acting	statesman
sociology	directing	(probably both of these are merely derivatives of public speaking interest which is closely allied with that of acting)
	music (slight)	
	public speaking	
	literature	

But, throughout, there is the one outstanding interest, already spoken of, that of writing, which appears early and was fostered by parents and rewards during school days.

Subject 26 reveals few lines of interest development. He was cast in a severe economic mode, which is shown in different degrees in the various autobiographies given here.

SUBJECT 26: MALE; EDUCATION, PH.D. DEGREE; AGE, ABOUT 35; MARRIED

Up to the age of 10 or 12, I can remember no definite vocational decisions. However, I was always taught that one must study hard in school, that an education pays, and that one who does not improve his opportunities in school will regret it later. As I look back on those years, I can say that I faithfully tried to follow these precepts.

At about the age of 12 I came to have an idea that I should like to be a foreign missionary. This ambition was almost wholly due to very strict religious training which I had from earliest childhood, and which I tried more or less consistently to live up to. In my twelfth year I was well saturated with religion, both externally and internally, and I think this caused me to want to be a missionary. However, the ambition did not last long.

My next ambition was to be a farmer. I lived on the farm at that time, and remember puzzling about "what I should be" when I grew up. I remember distinctly a few occasions when this question was asked me, and the feeling which I had in trying to decide. I did not think constantly on the question, but experienced serious attempts at solving the problem at intervals. The fact that I knew nothing about any other occupation had considerable influence in this decision. Intent to be a farmer died after a while, but recurred two or three more times, as shown below. All the time I heard that one must have an education to succeed, and I had a sort of a blind conviction that I must go to school. This refers to the period of about 14 or 15.

For several years, beginning with the age of 13, I worked on the farm by the month. (My father died when I was 7, and my mother when I was 12.) I attended the country school until I was 15, working for my board. When about 15 I began to want to be a locomotive engineer. It was more the things an engineer does, rather than the interest in machinery, which attracted me. About this time, too, I made the attempt to enter as an apprentice into locomotive machine shops, but did not succeed because there was no place in the shops where I tried. When 16 years of age, I "went into town" to attend school. I entered the eighth grade (I was ready for high school at the age of 13). However, this eighth grade had a class of students who were as old as I, and we really handled the subjects. I was 17 that winter, and my teacher suggested that I attend the county institute the coming summer and take the teachers' examination. This I did, and passed the examination, receiving a third grade certificate. In explanation, I will say that in that State a third grade certificate was issued

when one passed an examination dealing with the common branches, and sets of questions based upon reading circle books.

I was successful in the scramble for country schools, and taught the next winter in a country school. Teaching a country school was a higher position, both socially and financially, than working on the farm by the day or month. It took me all winter to make up my mind whether or not I would teach that country school the next year and farm in the summer, or whether I would go to high school. I finally decided upon the latter, and entered high school when past 18 years of age. The work was very easy, as it would be to one four years over age and who had the elements of grammar, arithmetic, geography, etc., at his tongue's end. So I took extra subjects. It was a three year high school, and I arranged with the superintendent to finish in two years. To gain a knowledge of Latin and algebra I attended a summer term at normal school. The work I had been doing was too easy, but at normal school I found plenty. I went back that fall instead of to high school.

From 19 to 24 I taught, worked at any kind of job, and went to school. I liked my experience in teaching, and that with the normal school atmosphere started me to teaching. Finishing up the work for a degree came about through the following reasons: I knew that if I continued to teach I would need the work and the degree; I played on the football team and was urged on all sides to return; school loyalty; a real desire for what I would get out of the curriculum.

After I finished college I was principal of a high school for two years. During this time I came within an ace of going back to farming. A very attractive offer to manage a ranch came to me, and I considered it seriously. The hitch came when I was asked to put up a sum of money I did not have. So I went back to the high school principalship. I stopped that, and went to graduate school so that I could advance in teaching. I expected to stay only a year, and to come back and take the position of superintendent in the town where I had been principal. A quarrel among the members of the Board of Education alone prevented it. But I wanted to stay the time out in the university and complete the work for the Ph.D., and this I finally did.

During my college course I became very much interested in agriculture, as I attended a number of courses on the subject. I had my credits checked at the University of ——, and found it would take me at least a year to get a B.S. degree in agriculture, whereas I could enter graduate school in education or psychology immediately.

My vocation has been determined by the conviction, implanted in early youth, that education pays; and by the tendency to do the best I could under the circumstances. But I always liked school work, and have never felt that I would be much better off in some other line of work. The desire to "amount to something," implanted in early youth, and the forces of environment made me a teacher.

I am now taking a year to do further study. I want the next place I have to be a permanent one, where I will teach some undergraduate students and where I will have graduate students and a chance to do some research.

The urges to be a foreign missionary and to be a locomotive engineer appear to have passed away very quickly in this man, and to have been nothing more than the casual inclination found in so many children. Farming and education were lasting interests, both of them growing out of the boy's early environment and family training. At several times the choice appears to have been close, and practical reasons are advanced for the development in one line rather than the other. It is not impossible to suppose that this man might have been a successful farmer had he not so early acquired a belief in the importance of education, but with this belief so thoroughly established the educational path has more prestige than the farming one. The individual's "choice" may have been determined quite as much by this as by his practical considerations. Individual trends become so mixed with traditional teachings that it is difficult, if not impossible, to separate them. In this case the vocational choice appears to be a happy one, but a strong family tradition has been known to make poor educators out of good farmers, so powerful are the social factors over the individual ones. Family tradition may also prevent a good farmer from being good, or a good educator or anything else, by attaching prestige and approval to some other occupation. If we could infallibly detect the individual's original preferences, would the problem of vocation be solved? Not at all. The social pressure to which he has been subjected for twenty or thirty years becomes an essential part of his interests; it too must be taken into account in any final adjustment. In this present case all has worked out successfully, although it is not impossible that this man, on seeing a field of ripe wheat in the sunshine, feels an old nostalgia and wonders if after all he should have gone into agriculture. Such reveries are common to us all and may mean little enough, or they may mean a great deal.

Subject 27 is a woman of superior professional accomplishments.

SUBJECT 27: FEMALE; EDUCATION, PH.D. DEGREE; AGE, ABOUT 30 YEARS

General statement: I suppose that most girls daydream of marriage and children, but I never did; all my daydreams up to a fairly mature age were concerned with vocational ambitions. I was probably twenty-one before any erotically colored phantasies came into the picture.

Vocational interests prior to twelve: I attended school very little until I was 12 years old, so that I had plenty of time for make-believe play, reading and daydreaming. I recall much of my make-believe when I fancied I was a wonderful singer, a prima donna, posing on the stage. A quaint ambition, for I certainly have no voice, but presume it may have grown out of the fact that as a child I was taught to sing, and my parents thought I sang very well. There were other phantasies, but I remember them less clearly. Probably these daydreams grew out of the amount of reading that I did, and the fact that I had to amuse myself as I was an only child and had no playmates most of the time. I don't know whether I tried to picture myself as a writer at that time or not, although I did find out then that I could string words together to make verses, and that I wrote stories of all the episodes on the farm, my pet chickens, etc.

Grammar School: (12-14). I entered school late, as I said, and practically spent only two years in grammar school, making the seventh and eighth grade. My vocational interests were intensely practical at this time; at my mother's suggestion, I was convinced that I should go to high school, normal school, and then teach. There was certainly no other reason why I should have chosen such a vocation, for I was having any amount of difficulty in adjusting to the school routine; I had almost a special disability for arithmetic, and it was hard for me, after my long seclusion, to get along with the group. However, I accepted my mother's plans unquestioningly, and played school and wanted to be the teacher religiously on the winter days at noon time.

High School: (14-18): In high school, my vocational aspirations underwent a decided change. A young teacher, fresh from college, discovered that my themes and stories in English class were above the average, and encouraged my smoldering desire to write. I often wonder how she had the patience to read the multitudinous manuscripts I thrust upon her. But she did, and criticised, and I worked all my leisure time writing. She also suggested college rather than normal school, and as I had a definite case of hero-worship where she was concerned, I was determined to go to college, become a teacher of English and languages in order to support myself while I was becoming established as a writer—just the things which my model was doing, in fact. She proceeded to help me by convincing my parents that college would bring more financial returns in salary than normal school, so they decided to send me there. So I went through the last two

years of high school after she left, writing my poetry and stories and sending them to her, and never doubting but that I had solved all the problems of vocational adjustment.

College: (18-22): For a year in college I stuck to my original plan, and took all the English and languages I could get into my schedule and still comply with the requirements as to prescribed courses for Freshmen. Sophomore year was very upsetting, from the vocational viewpoint. I did not like the English teacher; one of the language teachers was what would popularly be termed a freak, and although there was another who was much to be admired, I began to tire of the diet I had elected. Then I began to hear rumors from upper classmen of the wonders revealed by the microscope in the zoo lab, and of a wonderful teacher of psychology and sociology. Second semester of my sophomore year I got in a course of sociology, and carried away by the personality of the professor and interest in the subject, I threw overboard all my original plans and determined to major in his department. Anyone who has heard —— lecture, will not be surprised at my sudden change. Add to that fact that he was the professor, the courses in social origins with Thomas' Source Book as a text, you can see how I, who had always read mythology avidly, was captivated by such a new world of primitive folklore to explore. There was an added motive which came into my vocational choices at this time. I was struggling with many personal problems incident to making the adolescent transition, which psychologically came rather late in my case, because of my isolation at home and having been a spoiled only child, etc. I was only beginning to get into group activities; I was horribly self-conscious and lacking in social poise, I was beginning to have some curiosity as to sex matters, which had never particularly concerned me hitherto and concerning which I had only meagre information. I had also a marked feeling of inferiority, growing out of a sickly childhood, and continued by the lack of social poise, the fact that I was from a small and ill-preparing high school, had not the money to buy good-looking clothes, and generally felt immeasurably handicapped in comparison to many of the girls, especially those who were extremely attractive and knew all sorts of sophisticated ways to do their hair, etc. Also, it was something of a financial struggle for my people to send me to college at that time, and I was constantly beset by ethical struggles as to whether I had any right to let them do these things for me, etc. I turned to Professor —— and to psychology and sociology as the oracles which would help me solve my own emotional conflicts. My vocational course became resultantly more hazy. I finally abandoned the plan of teaching English and languages in high school; Professor —— assured me that he could get me a fellowship at —— if I wanted to become a clinical psychologist and a fellowship at some western state university if I decided to teach sociology. And graduate work was definitely deter-

mined. Then, at the beginning of my junior year, in order to have the necessary background should I finally decide that psychology was my chosen field, I took all the zoology courses that I should have taken the previous two years when I was obsessed with the English and languages notion. My senior year I became student assistant in that department, and was offered an opportunity to stay on teaching and working for my master's degree there. I admired this professor almost as much as the sociology professor, so that there was a great deal of indecision in my mind. My mother wanted me to stay on, as she dreaded my going so far from home. Professor —— tried to explain to me how much I would regret it if I took my graduate work in any subject at any than an approved institution. Then I heard —— lecture at chapel one day. I had long been reading all the books in the college library and in the professors' private libraries upon the subjects of abnormal psychology, psychology of emotions, and mental diseases. That evening I met Dr. ——, told him a little of my vocational conflicts, and suddenly inspired, insisted that I wanted to be a psychiatrist, but since I could not afford such long and expensive training was compromising on abnormal psychology.

University: (22-24): The university work was done while I was worried as to how I should finance my Ph.D. work, for I had by then determined that that was my goal. Teaching seemed to be the only thing I could look forward to, and when I got my degree at 24, I found I was looked upon rather skeptically as a candidate for the positions to which I could by reason of my academic degrees aspire. Meanwhile, I had known rather intimately Dr. ——. She talked to me of going into practical work in psychology, but at first I refused. Finally I became psychologist at a state reformatory for girls. I went purely to learn to know better the psychology of the prostitute. While there, I met a psychiatrist, who one day casually remarked that he would give me an interneship at —— some day when I had finished my work at the reformatory. That now became my fixed ambition. I was sure that it would help me solve many of my vocational problems. It would give me the definite clinical experience which I so sorely needed, and at the same time, I should have a chance to watch those demi-gods, the psychiatrists, and size up my own chances of success if I could manage a medical course. The interneship finally came through, and I accepted it. From the vocational viewpoint, it was the wisest thing I ever did. This was the final definition of my vocation as a consulting psychologist.

Vocational interests and plans for the future. I still recur to my ambition to write a novel, though less and less frequently as I get absorbed in work. I did take a course in short story writing over a year ago, but never found time to work over any of the stories. For a long time, the psychological clinical work held me simply because of the literary material which I could collect incidentally, but now it has

become an end in itself; in other words, I seem to have made a transition from the imaginative to the scientific as a motivation. Now, I know that I should make, in all probability, a good psychiatrist, and I often think that next year I will go to medical school. But to deliberately throw up a good salary, even with the prospect of a better one at the end of another four or five years, is not easy. I really don't see that I have any definite vocational plans, or that I ever have had. I have simply drifted wherever the path lay open, in accordance with the suggestions made by whoever influenced me at the time. Perhaps the thing I should best like would be to work on a private mental hygiene clinic for children, with one of two psychiatrists whom I know, and a certain social worker to carry out the treatment end of things. In such a clinic, there would always be time to make adequate studies of the child, and the parents would presumably be so situated financially as to be able to carry out any and all recommendations.

This is another case in which interest in certain personalities seems to have been dominant at crucial points. The early and continued interest in writing may be partly if not wholly satisfied by writing in scientific fields, the singing fell out because of lack of voice, while the scientific interests have steadily increased. Teaching seems never to have been more than a borrowed ambition that has had little influence upon later development.

Subject 28 says, "I never, at any time, had an impelling ambition or aspiration for any particular calling or profession." Like some of the others, his history shows the marked effect of an early influence, in this case of the father who instilled the need of Christianity, frugality, honesty, and education. It is not infrequently found that a boy or girl grows to maturity with no other objective than that of "getting an education," and while this frequently leads to the teaching profession it does not necessarily have this effect.

SUBJECT 28: MALE; EDUCATION, A.B. DEGREE; AGE, ABOUT 30 YEARS

As well as I can remember during my grammar and high school days, my goal was a college degree. From my earliest recollections, my father instilled very strongly in my mind the need of active Christianity, frugality, honesty, and education. If I had any bent for any particular vocation, it was civil engineering; in fact, up to the time I finished college I rather expected sometime to be a civil engineer. My life was always influenced very much by the financial and economical

side, since I grew up on a small farm, one of a family of seventeen. I had shifted very largely for myself, and when I had finished college, I accepted a teaching position because I could make more money immediately that way than any other. At that time I had not planned to teach permanently; in fact, I had no definite plans for the future except to teach long enough to repay my father for money loans to put me through college. While teaching, I was offered a fellowship in astronomy at the —— through the influence of my mathematics teacher at ——. I accepted this position, not because I was particularly interested in astronomy, but because it would give me an opportunity to study graduate mathematics, and this continued to be my attitude toward the work at the University. In my two years' teaching in prep school, I had learned to like teaching, so when a job at —— College was offered me at what seemed at that time a good salary, I accepted it, and have continued in the teaching profession since, except for the break caused by the war, and as far as my ambitions are now, they are to continue teaching.

My father has influenced my life more than any other one man with whom I have come in contact. In fact, I don't believe there is any other one man so far outstanding in this respect to merit particular mention, although undoubtedly I have been influenced by a great many teachers, room-mates, and associates. As I see it, the trend of my life in the choice of a vocation, has been influenced perhaps more than by anything else, by the economical side, and by environment into which I was thrown. I never, at any time, had an impelling ambition or aspiration for any particular calling or profession. I had instilled very deeply by my father, and have always had, a desire to do whatever I attempted to do, honestly and conscientiously.

As to objectionable work, I have never found any work, whether it be hard labor on the farm, saw-mill, iron ore mine, in the army, or the routine of practical astronomy or teaching, particularly unpleasant or objectionable. The one unpleasant bit of work I did attempt to do was the selling of stereoscopic views during one of my college vacations. I had fair success while I worked at this, but I quit it in disgust in the middle of the summer because I felt as though I was making people buy something that they did not need, in many cases could not afford, and would not buy except that they did not know how to turn down an agent.

Specific vocational interests mentioned in this autobiography are few. Civil engineering, mathematics, astronomy, and teaching are about all. There is a distinct aversion to selling. Here we find the subject engaged in an occupation which violates some of the early teachings of his childhood, so that he became disgusted with making people buy things they did not

need and perhaps could not afford. In general, he finds no work particularly objectionable, and says: "As to objectionable work, I have never found any work, whether it be hard labor on the farm, saw-mill, iron ore mine, in the army, or the routine of practical astronomy or teaching, particularly unpleasant or objectionable."

Subject 29 is the autobiography of a woman whose early desires spring from an aversion rather than from an interest. Anything rather than housework! It cannot be doubted that many women, joining in the feminine rebellion against domesticity, have made vocational selections on precisely this basis, and in this fact may be found some explanation of the dissatisfactions and limited successes of women whose ability would seem to fit them for more than they have achieved. When the motivation is away from domesticity any occupation may seem desirable at the moment, although interest in the job itself may never develop under such circumstances, and the job further on may seem the one that is going to be, but never is, the final solution.

SUBJECT 29: FEMALE; EDUCATION, PH.D.; AGE, ABOUT 30 YEARS

Grammar School Period: I don't believe that my interests during this period were very clearly formulated, but I wanted to do anything that would keep me out of housework and attending to children. One of my married sisters had four small children and a house to keep, and I was frequently called upon to help her out with the children. I wanted to do anything except keep house: teach, work in a factory, or take in washing. During a part of the period I had vague dreams of being a great poet, and I often wrote the little jingles which I spoke at the Friday afternoon exercises in school. My mother discouraged me from this, telling me that only very great people could write poetry.

High School Period: During this time I decided I wanted to be a teacher of English literature because I so much admired the young man who taught us English. I had not thought that I would go on to college, but he encouraged me to do so. I planned to teach English and then to write, novels, this time, like Sir Walter Scott. I wrote for the high school gazette, and the teacher of English encouraged me to continue writing.

College: I decided that I wanted to be a foreign missionary. I heard —— speak at Blue Ridge, and I thought that it would be wonderful to go to India to help out the child widows. I wanted to study medicine so that I could be of more service to these widows. I

definitely planned to go to medical college after leaving college, but I could not get hold of the money.

Teaching: Taught because I could not get any other sort of job. Hated it, and though I soon lost all desire to be of service to the child widows, I continued in my efforts to be appointed as a foreign missionary so that I could escape from teaching and have the opportunity to see something of the world.

Graduate Work: Went to the University of —— summer school so that I could get a better position as teacher. Became interested in sociology through Dr. —— who taught there. Decided to continue graduate work which would take me to New York and permanently away from small town teaching. Thought that I would prefer to teach in a college. I expect to continue in teaching and do some writing along sociological lines in which I am interested.

Work: Work with the —— and the editorial work, together with the various summer jobs, were undertaken in the spirit of adventure and out of curiosity to see what the work would be like. As soon as my curiosity was satisfied I lost interest in the work and wanted to move on to something else.

Interests mentioned in this history include:

Esthetic	*Remedial*	*Scientific*
poetry (creative)	foreign missionary	sociology
novels (creative)	medicine	

Aversions

house work
child care
teaching in grammar school

The frequent changes made by this woman are in harmony with her statement: "As soon as my curiosity was satisfied I lost interest in the work and wanted to move on to something else." Her success as a college teacher has not yet committed her to this as a life work.

Subject 30 appears to be more opportunistic than the average. One thing leads to another, according to external circumstances. No avocational interest of any strength is mentioned, nor is there evidence that the intrinsic interest in any of the vocations named was a determining factor in the vocational development. The Y.M.C.A., teaching, and applied psychology are considered as opportunities for successful functioning, while for none of these is there manifested any driving passion.

SUBJECT 30: MALE; EDUCATION, M.A. DEGREE; AGE, ABOUT 28 YEARS

I remember nothing definite about my vocational ambitions prior to about the age of 13. I have a faint recollection of desiring then to enter my father's business, and also of becoming the president of the United States.

About the time of my graduation from grammar school at the age of 14, I made up my mind to quit school. I had come to the conclusion, due to a trivial incident, that I should no longer be an expense to my family. I thought at first that I would go into the —— business with my father, if he desired it. Then I built up quite an enthusiasm for the jewelry business, considering it from the merchant's standpoint. This I talked over with my father. But he told me I had better go to high school for I would need further education, which settled it, as this was evidently what I wanted to do.

During the first two years of high school I was not concerned greatly over my vocational future. Of course, I planned to be a great man. My brother had started in the —— business, and I sometimes imagined myself going into business with him—handling the sales end of the business while he handled the shop end. I felt very superior in this idea. Occasionally I thought of going into my father's business, but he discouraged this idea by his attitude that he didn't wish any of his sons to follow in his footsteps. In the senior year of high school I became enthusiastic over Y.M.C.A. work. The physical training appealed to me, for, due to my undeveloped physique while in high school, I felt inferior in sports, although I played quarterback on the football team when a senior, after several years' subbing. The glamour of social service also appealed to me as a result of the influence of the secretary of the local Y.M.C.A. I am inclined to think that this Y.M.C.A. secretary was largely responsible for my choice of Y.M.C.A. work. While I was most interested in the physical activities, I planned to enter a college for Y.M.C.A. training one year following high school graduation. This was the most definite vocational choice I have ever made. I planned to teach school for a year to save some money, accepting a position as teacher of a country district school during the spring of my senior year for the following fall. The plans were carried through.

Before going to —— College, I remember no ambition to do religious work. About three years previously I had joined the church and had always entered into church activities, but I had a distaste for what is usually considered "religious work."

Graduating and taking a degree from the college, I took a position, full of enthusiasm, and much engrossed in my own superiority as a Y.M.C.A. secretary. My disillusionment was not entirely complete in the two years that I worked at this, the last year of which I became the director of the department in the city association in which I

sional possibility. I have never had a personal ideal in music. In quite different circles I played on the violin in many public performances—high school orchestras, University Philharmonic Society, at churches and schools. With a younger brother I boxed and did bag-punching, in Athletic Clubs and in annual gatherings of Clubs. Except for a few short outbreaks they have been quite submerged since beginning high school.

Up to the last eleven or twelve years music was very strong in my interests. Other emotional outlets have probably lessened my interests in it.

Off and on for the last three years the mental testing side of the work has been drudgery to me. Interest in improving writing is somewhat in background at present, interest in perfection of boxing and bag-punching in ascendancy. Psychological research, treatment in child guidance (psychoanalytical also) and teaching are my main interests.

This subject shows a fairly wide range of interests. The interests listed follow:

Professional	*Linguistic*	*Scientific*	*Motor*	*Esthetic*
law	German	history	fire	violin-playing
teaching	French	psychology	engines	music
preaching		educational	boxing	writing
consulting		psychology		
psychology				

Subject 32 has classified interests and positions as they have developed.

SUBJECT 32: MALE; EDUCATION, M.A.; AGE, ABOUT 25 YEARS

Developmental Periods:

I. Grammar School—age 5½-12.

a. Positions held: the usual schoolboy jobs, e.g., delivering papers, delivering for the butcher, grocer, drygoods merchant, et al.

b. Vocational aspirations:

aa. Boyish ideals—fireman, policeman, soldier, etc. I can remember explaining to my mother my desire to become a fireman. She told me that firemen often had to go on the roofs of burning buildings and that these buildings sometimes collapsed with disastrous results to the firemen. That ended my hankerings after the fireman's life.

bb. As far as I can remember there was always a certain desire on my part to enter the Church. When I was just a little lad my grandfather and I would go to church in the morning. In the evening we would stay at home alone while my mother and father went. In the meantime my grandfather would have me (aged 8 and up) read from the Bible and then preach from it to him. This grandfather and his brother, who was quite a preacher, used to tell me I was to go into the ministry.

II. High School—ages 13-15.
  a. Positions held: boy assistant in drug store; delivering papers.
  b. Vocational aspirations:
    aa. Law; politics; business; Church.

III. Business—ages 16-17.
  a. Positions held: druggist's apprentice and assistant.
  b. Vocational aspirations:
    aa. Ostensibly business (and largely so), but certain hankering after law, Church, etc.

IV. Post-graduate work at High School—ages 17-18.
  a. Positions held: druggist's assistant.
  b. Vocational aspirations: business pretty well out of the running, the Church taking the lead, with law and politics running a close second.

V. College—ages 18-21.
  a. Positions held: druggist's assistant in winter. Various summer jobs: (1) dishwasher and steward on Alaskan boats (two summers), (2) newspaper canvassing and drugstore work (one summer all told), (3) land survey (one summer).
  b. Vocational aspirations: Church, teaching, law, politics.

VI. Post-graduate work and teaching—ages 22-24.
  a. Positions held: fellowship at —— University, assistantship at —— University, instructorship at —— University.
  b. Aspirations: Teaching and research.

Possible Influences Causing Change in Vocational Plans:

I. Church: influence of grandfather, general religious upbringing. When I was between the ages of fourteen and seventeen I was in close touch with a minister of whom I thought a great deal. He urged me (and still urges me) to enter the ministry. At

college I had a number of friends among the theological students and was almost one myself. I think I passed up the Church because of (1) intellectual doubts, (2) lack of respect for those in charge of its work, (3) the general indifference toward the Church that prevailed more and more in the circles I came to mingle in, (4) perhaps at one time a certain fear of ridicule—in fact certainly so. The longer I went to college the more remote became the possibility of my entering the ministry.

II. Law: influence of father who would have liked to see me in law and politics. My sister worked in a law office and used to talk a great deal about the men there. I met a number of the students. Also, when I was in grammar school, I acted as office boy in my sister's office for a week one summer and was greatly impressed. Law always appealed to me because it would give opportunity for public speaking and I longed to thrill the multitudes. This applies also to the Church and politics and, to a lesser extent I suppose, to teaching. I believe you psychologists talk about Exhibitionism at this point. Well, that's it. I think one reason I didn't go into law was that it would mean doing some things I didn't want to do. Also, lawyers were not highly regarded in the radical circles I knew as an undergraduate (so also for preachers). My Marxian friends told me they were "parasites" and the paid servants of the capitalist class and unproductive and generally to be despised.

III. Politics: I was brought up in the atmosphere of political and of religious discussion. Law and politics went well together, the first being the gateway to the second. I longed to command the applause of listening Senates. I was a fairly successful debater at college and, by one writer, compared to the Younger Pitt in his earlier debates. So why shouldn't I be Prime Minister too? I was also radical and wanted to remake the world.

IV. Business: When I was 12 I met a young druggist whom I liked very much. I worked for him for several years. He told me about his experience at the College of Pharmacy, etc. Then, when I matriculated from high school I felt rather bound to go to work, at least for a time, because my family was not wealthy and had made great sacrifices to keep me in school. The principal of my high school said I was too young to go to college and might well work for a while. So I became apprenticed to a druggist, with the notion that I might keep on at it. For a year I washed bottles in a dark cellar (like David Copperfield) and put up Epsom Salts. I hated it. Then my old principal came around and asked me to go back for the new post-graduate course he had instituted. I did so with great joy.

V. Teaching: In my freshman year my teacher in history told me he thought I had some brains and might make a historian. This was the first time I had ever dreamed of being capable of the academic life, but thereafter this became more and more of an aspiration. In my senior year I was quite undecided as to my future course. Then I was persuaded to apply for a fellowship. I did so, was awarded it, and started in for history.

VI. For the future I seem to be fairly definitely started in the direction of teaching and research in history. I shall probably specialize in the field of medieval history and may do some work in the Byzantine Empire. My desire to go in for teaching is very largely due, I think, to a liking for the academic life and to the fact that my abilities seem to run along that line somewhat. Any research I do will probably be done because of persons I have met who have urged such doing and because I should like to become a minor authority on something. The Middle Ages interest me and to specialize there would give a reasonable excuse for playing with religious and theological ideas. The Byzantine Period would necessitate using both Latin and Greek; thus I should have a decent excuse for tinkering with the Classics without appearing to be scattering my energies. And to have a period that make possible all of these things seems rather ideal. I must admit that my likes and dislikes for individuals influence me a great deal, it seems, and the men under whom I would work according to the above scheme are people I think a great deal of.

I believe also that the reading I have done and the thinking I have tried to do influenced me considerably, but it is difficult to particularize here. Law, politics, and the Church still play a little part in my thinking, but probably not enough to amount to anything.

Here is a sketch of interests and positions with an analysis of motives. The boyish interests in fireman, policeman, soon die out; the adolescent interest in pharmacy is promptly dissolved by practical experience, but the interest in the church is carried over into maturity. The church, law, politics, and teaching all have some of the same appeals, as pointed out by this man. The group to which he was most drawn has influenced him in the election of a profession which permits him to continue many of the cultural interests of earlier days.

Subject 33 gives an account of a life that began on a casual and opportunistic basis. The vocation of surgeon is relin-

quished and business accepted without any definite, powerful interests being involved. The branch of business likewise seems not to have been very important. The basis for the great change after thirty, into an occupation of social service, is not clearly given but the appeal appears to have been unusually powerful. The resulting success in the new work, following success in the business world, suggests that more of the same qualities are involved than at first sight appears to be the case. However, a very definite shift in interest is obviously required to bring the salesman's capacities into the service of the Y.M.C.A. secretary.

SUBJECT 33: MALE; EDUCATION, HIGH SCHOOL GRADUATE; AGE, ABOUT 50 YEARS

As I think back, it seems to me that I have just gone from one relationship into another relationship, each growing naturally out of the previous situation. I left college where I was preparing to be a surgeon because of family objections to a choice of that vocation. I went into business without any particular choice of vocation. I began at about 20 years of age and continued in business until I was about 32, making one change during that period. This change did not involve a change of vocation which was that of salesman; finally, I became an expert in style patterns.

At the age of 32 a secretary of the Y.M.C.A. was foolish enough to see some qualifications in me for the religious work of the Association and extended to me a call. The determining factor in that change was the facing up to all that would be involved in refusing it, and the consequent conviction of the loss of one's inner integrity and the conviction of moral and spiritual cowardice. This was a period of real crisis, and for two months and a half, I studied the situation and wrestled with the problem. The final decision was reached on as clear a venture of faith as anything I have ever undertaken, and speaking very honestly, I feel that the experiences of the past 18 years have shown the wisdom of that venture in faith. I know that it was a great personal good to me to change from the interest in things and selling things to the interest in men and the putting across of ideas and ideals. The mental reorganization that was necessary, compelling me to go through about five years of hard study, gave me a new mental freedom and developed within me a capacity of which I was not aware. The settling of questions on the basis of deep inner convictions has almost become a habit with me and that is why it is so difficult to think back to the period when very many choices were dictated by chance and opportunism.

Vocational interests mentioned by Subject 34 show a definite sequence from the original interest in nursing, through medicine, medical social work, to psychology. Outside of this line of development, which has led to work related to the work of a psychiatrist, are the two esthetic interests, one in writing and a stronger one in dancing. The influence of family prejudice is shown in checking the nursing and the dancing as vocations, while the positive influence of others is shown in the writing and in the psychiatric work.

SUBJECT 34: FEMALE; EDUCATION: A.B. DEGREE; AGE, ABOUT 25 YEARS

High School—15-18½ years.

Early in high school, possibly during first year, I became ambitious to become a nurse. This ambition persisted and increased in intensity of desire until I was about 20 years of age and in the second year of university. Reasons for change: (1) marked opposition to nursing profession by my parents; (2) unexpected opportunity to complete university course; (3) gave up idea of becoming public health nurse because I flunked chemistry, a requisite course at this time.

University Life—19-23 years.

Early in college my aspirations to become a nurse waned, and I aspired to higher goals. I next went through a period of intense desire to become a writer, colored partly by the fact that I had for instructor in English, a poet who took a personal interest in my ambitions. This ambition I still harbor, but without any very definite ideas or plans for the future.

At about 21 or 22 years of age, I decided that I would like above all else to become a physician. This was impossible because of economic pressure so I went into sociology for the last two years of college, specializing in hygiene and medical social work. I always held very definitely to the idea of doing medical social work, and became part-time worker in a clinic during the last year of college. At this time (23 years) I was in the neuro-psychiatry department of the clinic, and became definitely interested in that particular field. This interest still persists and I still have faint hopes of studying medicine and specializing in psychiatry. It was because of this interest that I accepted my present position, so that I could be in close contact with psychiatric work.

I have always fostered a desire to become a dancer to such a degree that it has become an avocation with me. However, I feel it might have as well become a vocation, were it not for family prejudices and objections early in my life, which prevented even taking dancing lessons.

WHAT THESE INTEREST HISTORIES OF ADULTS SEEM TO SHOW. These interest histories secured by the autobiographical method, often show in retrospect a continuity that could not have been forecast by the use alone of subjective or objective measures of interests. When the pattern is completed it is not so difficult to follow the design, although there is found to be little or no prediction from any one interest. Where at first appears confusion, order at last is seen. From the wide scattering of early interests there is a concentration into certain definite lines, so that the interest history will reveal a genetic growth of interests which might not be indicated on a forthright test of permanence but which has a genuine significance to the individual's interest adjustment.

Human nature still appears to follow orderly laws of growth and development and to conform to the cause and effect sequence, the predictability of which was formerly the basic theory of all scientific approaches. The bases of choice of interests may never be entirely known, because of the complexity of the problem, but there appears every reason to believe that such discriminations have very definite causes. Where a similar choice is made repeatedly by the individual such discriminations seem to be an integral part of his personality and not lightly to be set aside.

Previously, it has been said that counselors of youth often find it necessary to divert the individual from one choice to another, on the grounds of social or financial expediency and above all on the grounds of too little or too much ability for the task. It is not contradictory to warn against lightly shifting a line of interest that shows a genetic growth in the individual's life history. The immediate object of interest may be impractical; the individual himself shifts from one object to another object that grows out of the first interest, although it is not necessarily the same; it is not the immediate object that is important but the continuous line of development. Some interests spring up like solitary weeds and die out without leaving any record; others are like a grapevine putting forth new shoots here and there but conforming always to a law of internal growth; no one shoot is as important as the parent root.

More or less roughly every clinician does, of course, endeavor to find these root interests which continue to put forth new shoots at different phases of the individual's development. One trouble now is that in many cases we do not know the interests which should lead to other specific interests. Occupational classifications are made on artificial bases which may not be representative of the naïve interest appeals to which the individual is responding. The knowledge of the interviewer, his own neat scheme of similarities between various tasks, may not be based upon the psychological appeals and his superior knowledge of the processes involved in a particular occupation may handicap his interpretation of the subject's choice. With the young there is the further difficulty that their interest history is still obscured by the early scattering and that time is necessary for the emergence of definite, continuous lines of interests.

These interest autobiographies of superior adults suggest a few general causes of the development of interests. First, perhaps, is the economic cause, which is seen in almost every history. Vocations are determined, which are very happy choices, by the fact that they minister to the vital needs of life. A second cause, possibly equally important, is the chance stimulation of the environment. Interests are made by the fact that the individual has chance contact with certain objects and activities. A third cause, also equally important, and the one most often mentioned in these histories, is a personality, or personalities, older than the subject, who suggests a line of development. Often, with women, this personality is a man. Frequently, it is a great scientist or successful person read about or listened to in a lecture. The personality influence as a determiner of interests has, it would seem, been neglected in the understanding of the development of interests. Fourth, as a causative factor, is the general motivation of the individual to be recognized among his fellows. This is an obvious cause to most clinicians. The intrinsic factors of an interest seem less important in most of these histories, but they constitute a fifth general cause in the development of interests. They are seen, in particular, in those histories where the subject was interested in a vocation, such as writing, in early life, and the intrinsic

satisfaction of the work appears to be a major causative factor in the development of this interest. But it will usually be observed that the prestige of this vocation, the general motivation to be somebody in relation to one's fellows, is equally important in the development of this interest. Generally, intrinsic interests seem not to be strong causative factors in the development of the interests of these subjects.

A STUDY OF THE INTEREST HISTORIES OF OLDER WORKING WOMEN. Lorine Pruette has used the interest history in the study of older women workers. Abstracts of case histories of six of these subjects, which include statements of interests taken in the interview, are given here, with such additional material as may be of value in understanding the subjects' interest development.[4]

SUBJECT 35

Woman over fifty, who claims college education, undoubtedly without any justification. She says that her education was above the average and that she passed all examinations, but that she was forced ahead so that her health was broken down. Her only interest was in music. At 14 she led the choir and at 18 everyone predicted a career. She never had to study as others did, could sing and learn quickly and memorized easily. Her relatives promised to send her abroad to study, but she fell in love, madly, breaking her relatives' hearts. Husband promised he would let her prepare for grand opera, instead of which he discouraged her in every way. She started to go on the stage, so her husband took her away where she could not. She always wanted to create, to make and mix up new dishes to eat. She says she knows how to prepare new dishes in the most dainty way and that she is a stickler for order and neatness. She does not care for detail, would rather command, as she loves handling people and always gets the best from them. Her father-in-law encouraged her to write. She feels that she has many stories worth telling if she could only get a stenographer who would organize them and cut them down as they should be. (Command of English remarkable in its inaccuracies.) Emotional difficulties led to a divorce, and she is now in some need. She went to live with a young woman friend as a companion for two years, shunning society. She regrets that she left this position for the business world, as she does not like it. What she likes is to decorate a home, look after color arrangement and she loves to build up people in real life as in stories. She likes to analyze plays, to pull them apart, then put them together again, living every part. She sees the

[4] Unpublished data furnished the author by Lorine Pruette from a study of maladjusted older women workers.

end of a book or play long before it is finished and notices details in pictures that others never seem to see. She is interested in everything, particularly the higher way of thinking. Her spiritual self wants to help others, to take children, build them up mentally—adults as well. She feels she has executive ability and loves to manage. She loves rare things and people who are refined. At present she feels she is not in her right environment. In her selling she was always able to sell herself. When seeking interviews she was always able to get in. She has sold hats, but could not sell the cheap ones at ten dollars, although she made a splendid model. Felt she had to leave because the girls talked about her, realizing how different she was. She has had plans of running a workroom of her own, producing artistic scarfs. She is willing to be a writer if a stenographer is supplied, or to go on the stage, to teach elocution by a method of her own, to be a psychologist if someone will give her a course, etc. She is also a designer and architect, designed one of the models of a famous car.

On the Stanford-Binet she has a mental age of 12 years, 8 months (confirmed by Army Alpha). On Stenquist Mechanical her score is less than the median for 12-year-old boys; on MacQuarrie it is at the median for 16 years. On the Social Intelligence Test her score is slightly less than that to be expected of the low-grade industrial worker. On all tests she was opposed to obeying instructions, cheated when possible, interrupted constantly. She showed grandiose ideas, and appeared to live in a world of make-believe. The psychologist felt that her authority and aggression, as well as other characteristics, indicated the lower grades of selling as the best possibility of earning a living.

Subject 36

A woman slightly over forty, who had to go to work when she graduated at 13. Before this she had had aspirations to be a teacher or a nurse. She was a clerk for a number of years, after which she did war work. Further office work was followed by position in a hospital in which she took histories, passed on admissions, etc. Difficulties with a superior finally led to her leaving this position, which she had held for several years. Since that time she has been unsuccessfully seeking work, over a period of months. In the fall she secured a part-time selling job in a department store, and was kept on after the Christmas rush. She does not like selling but she loves keeping records. She thought she would like medical social work, anything to do with hospitals or medicine.

On the Stanford-Binet she has a mental age of 16 years. On the Stenquist she made a score less than that for the 12-year-old median, but in spite of her lack of ability to do the problems she worked steadily without complaint and tried practically all of them. She had a quiet, appealing personality and claims to be very patient and hard-working. Her interest in hospitals made her eager to enter a training

course for practical nursing, although this was not recommended by the psychologist. Her history is entirely opportunistic and this final attempt might have to her satisfaction been made equally as well in a variety of office positions. Her situation is such that she must undertake whatever is opened to her, and the probability appears to be that she will be faithful and industrious in anything she tries.

Subject 37

Woman over fifty. As a child she was interested in plays, games, music, and singing. At an early age she took charge of home. After years of this it became necessary to support herself. She has held several jobs as housekeeper, practical nurse, etc. She feels she has the ability to help people mentally. She has been studying dramatics and psychology. While working in a hospital for mental diseases she felt herself growing abnormal and left to take a position as housekeeper. She is not satisfied with the dead-end nature of this, but is unwilling to be a member of an organization in a restaurant or hotel. She does not like administrative work.

On the Stanford-Binet she has a mental age of 13 years, 10 months, and did somewhat better on Army Alpha. On the Stenquist she is below the median for 14-year-old boys.

Subject 38

Woman over fifty, who has lost all her money. For a number of years she was a teacher, and she feels very competent to teach mathematics. Because of physical defects increasing with age, she does not feel able to conduct a regular class, however. She has recently been engaged in reading over the radio, as her voice is deep and carries well. She has always wanted to be a detective and the interest has grown in recent years. She reads detective stories, likes to work things out and is good at "finding things." She seems to think herself a bit "psychic," and she can always tell what time it is, without clocks.

She has a mental age of 17 years, 3 months, and on the Stenquist is equal to the median of the 14-year-old boy. She expresses herself well, has an unusually good memory for numbers, shows close attention and quick response on all tests.

Subject 39

A woman in middle years, who will not give her age. High school graduate. She was ready for the concert stage as pianist when illness in the family required her to go into teaching. She has taught in public and private schools, mainly language courses. During the war she did office work in Washington, after which she went into business.

Recently she has been governess for two children. In her office work she arranged files and did some statistical work. She has made candy to sell, but does not like the selling end. Her present aim is to sell books from house to house, hoping eventually to secure an office of her own. She is willing to undertake almost anything, suggesting as possibilities kindergarten in hotels, teaching languages, perhaps English to foreigners, interior decorating, salesmanship in insurance, real estate, or books.

She has a mental age of 16 years, 3 months, a good, but not aggressive personality, and an air of refinement. She appears to be turning definitely away from routine teaching and contemplating various forms of selling, although she does not like selling.

SUBJECT 40

Middle-aged woman, divorced. She says she was never a student, although graduated from finishing school with fair average. She was not musical and has never shown any creative urge. She has some money which she must supplement and thus is taking her time to consider all the possibilities before her. She has had no experience outside the home until recently, when she has been selling special articles to friends, although she does not like to sell. After canvassing the city, with the aid of friends, she finds there is nothing which she wants to do or which looks rewarding to her. She took a training course in bond selling, but does not want to do this. She would not object to inside position. She is not interested in dietetics, cannot teach, cannot sell—she says. She thinks interior decorating overdone and that it requires much tolerance and understanding of human nature. She feels you can lose money faster in tearooms than almost anywhere. She has considered some form of business of her own, but is not willing to risk her small capital. She likes to manage things already begun, to bring order out of chaos and to rearrange things.

She has a mental age of 16 and on the Stenquist she equals the score made by adult men in the Army. She states that she can do anything with her hands, that she always fixes electrical apparatus at home, etc. She has a superior personality and an honest outlook on her problems. It would seem that she might render valuable service in many organizations. Her careful consideration of the field and her inability to discover anything which appeals to her particularly have resulted in a blocking of all effort that is markedly in contrast with the usual procedure of seizing on the first tolerable opening.

These autobiographical statements of interests have a different flavor than any of those in the other studies. In some there appears the riotous day-dreaming of the untried and uncritical person, similar in many ways to the interests of the young child.

In others there is the absence of any feeling response to the world. They do, however, illustrate in connection with the results of tests of abilities that the problems of adjustment center around the development of interests. It would seem that even here with these maladjusted older women workers the genetic history of interests is extremely valuable in understanding the problems of individual adjustment.

SUMMARY. Most children have a sufficient number of interests; the problem with them is the selection of the most healthful at the moment and most profitable for the future. The adolescent is in much the same situation, with the element of discrimination between objects and activities of interests assuming greater and greater importance until the major choices of life are made. With vocation under way, mate chosen or already acquired, the adult comes into the long stretch in which his interests become attenuated, his attention concentrated upon one or two goals which seem at the time of surpassing importance. As these goals draw nearer they frequently acquire a startling insignificance; or, on the other hand, they vanish into the mist of dreamed and impossible things, and the individual comes into an affective aridity which may seem to make all things valueless. Choices do not remain choices; they have to be reaffirmed if they are to have genuine significance in the life history. With advancing years a steady attenuation of the objects and activities of interest is to be expected. This has already been recognized in common speech: an older person is frequently called "young" because of the variety of things in which he is interested. Not only do many former interests drop out, until the individual in looking back marvels that these ever carried an affective significance, but the capacity or at least the habit of making new interests markedly declines. The time comes when the old things seem subtly best, when thoughts hark back to the way that things used to be done, and we develop clever rationalizations to prove to ourselves, if not to others, that the old games, old books, old conveyances, old jobs are really better. For us they are better, because we learned them when the world was new, that is, when we were new, when the blood ran swiftly, the eyes were quick and zest came easily for a variety of things. But while fidelity to the

loved one is customarily esteemed, it is not so accepted that faithfulness to old interests and denial of new is altogether to be desired.

The genetic interest history of the individual is like a double pyramid. The apex of the first is to be found in infancy, the broad contiguous base appears in later life, from early adolescence into maturity, while the second pyramid tapers off very rapidly toward senescence until for the very aged only a thin point remains. The infant's first absorbing interest is in his own body; the last concern of the aged is the same. The first we find rather charming, the latter we sometimes irrationally consider horrible, but the process is the same, involving a narrowing of attention to but one focal point.

The clinical study of interests is still in an early experimental stage. The genetic history is an essential part of it. An interest history, if secured in detail, will be found to be rich in suggestion for the clinician or vocational counselor. Extreme lack of vocational interest and extreme variety of disconnected interests may be expected more frequently from the neurotic and badly adjusted. In the adjusted there will more likely be found a continuity of vocational interest trends, which is of course not at all the same thing as permanence of a specific object of interest. Further, the individual may show but one line of development of importance, or several lines, but in either case there is usually evidence of strength in the interest life. As more intensive studies are made it will be possible to forecast more explicitly the kinds of interest histories which are particularly significant. At the present stage it is desirable to gather what material is available and to subject it to a careful scrutiny in the complete process of the clinical study of interest.

CHAPTER XII

THE CLINICAL EXAMINATION OF INTERESTS

THE clinical picture of the individuals present interests can be made far more complete and authoritative than anything that has gone before because of the recent developments of interest measures. The interest autobiography will, of course, form the basis of present study for it is only there that genetic interest trends are evident. Theoretically, the examination of present interests is but the addition of up-to-date records to this history, but in actuality it is usually all that there is to depend upon in the interest adjustment of the individual. The clinical examination of present interests was outlined in the previous chapter, to include

(1) The "Own Story" of interests, which would be secured in the interview.
(2) Estimates of interests, or rating scale results, secured from parents, from teachers, from employers, from friends.
(3) Rating scale results, showing comparative interests between occupations.
(4) Inventory results, showing educational and occupational group scores.
(5) Objective test results, showing educational and occupational group scores.

A cross-section study of interests should include all measures of interests that time will permit in the examination. It is well to err here in testing too much instead of too little. If time permits the use of only one measure, Strong's Vocational Interest Blank, with its occupational scoring keys, is undoubtedly the best measure for occupational purposes in use with adults. But in a thorough-going analysis by tests there might be included, besides Strong's or other interest inventories, specialized information tests and Wyman's Free Association Test.

THE PSYCHOLOGICAL EXAMINATION OF INTERESTS. The psychological examination is, of course, an examination of the

total personality. Here we are dealing only with a phase of that examination in which the attention of the examiner is centered upon the subject's interests.

Various uses have been made of the self-estimate of interests since the development of a guidance point of view in education and industry.

A scheme for the interest examination of the individual was outlined by Kelley (*7*) as early as 1913. This study is of historical significance as the earliest attempt to survey the interests of the individual by tests and inventories and to offer educational guidance by means of a mathematical weighting of the scores in the various measures. However, practical efforts to include a measure of interests in the clinical examination of the individual are fairly recent (1924). These are all in the field of vocational guidance. (*2, 4, 10*) The psychological examination of interests for clinical purposes is at present taking definite form. (*5*)

The interest examination is an essential part of the program of vocational guidance offered the students at Leland Stanford University, California. Strong's Vocational Interest Blank, scored for various occupations, is used as the measure of interests. In this work of guidance the conclusion has been reached (*2*) that the results of the interest examination are second in value, for purposes of guidance, only to demonstrated educational abilities in preparatory professional subjects where the student has indicated his choice of a profession. When the student has no vocational choice, the counselor at Stanford, Mr. C. G. Wrenn, recommends the use of the Vocational Interest Blank, scored for four or five occupations in widely different fields, such as social service, public service, pure science, applied science, commercial and artistic occupations, as the best measure available for beginning the vocational guidance process and to help the student narrow down his choice of a profession.

THE "OWN STORY." The "Own Story" is the true story of the individual's interests. It is a statement by the subject of his aspirations, what he wants to do and be, and of his aversions or dissatisfactions. An Own Story should tell

exactly what the subject believes to be his interests and why he has them.

The Own Story is often given wider scope in clinical practice than this. The individual's statement of his own emotional conflicts, abnormal attitudes, and bad habits is included in many case studies. But the essential contribution of the Own Story to the psychological examination is the individual's own statement of his interests, aspirations, and ambitions, and of his aversions, dissatisfactions, and troubles.

To secure the Own Story is the major task of the interview. The technique of gaining the Own Story is a method of questioning without influencing the results. There are perhaps two methods. One asks direct questions, and the other gains its information through conversation. Both may be used with the same subject. What is wanted is information of

1. Enjoyments (interests): in work, study, play, religion, reading, people, and so on;
2. Troubles (aversions): in work, study, play, religion, reading, people, and so on.

Assuming that the individual is a school boy the direct method would ask such questions as:

1. What do you enjoy doing most in school?
2. What game do you like best?
3. If you could study only one subject in school which would you prefer?
4. What things trouble you in school?
5. What games do you dislike but have to play because others force you to do so?
6. What is the most disagreeable school subject that you study?

Information upon these topics is pieced together into the Own Story of interests. If the same technique could be used in securing the estimates of interests from teachers, parents, and employers, the validity of the interest judgment should be greatly increased.

Aids in the Vocational Guidance Interview. Many of the early interest questionnaires, such as Miner's Analysis of Work Interests, were prepared as an aid in the vocational guidance interview, to stimulate the subject in thinking of his

interests. This was prior to the period of the measurement of interests, in which the attempt is to summarize the interests of the individual into a score. More recently, questionnaires have been used as an aid in the interview. In this later use the study of interests often is interwoven into the study of abilities. A summary is made at some time during the examination in which interests and abilities are related in prognosis and plans for adjustment are made.

The best example of this newer use of the questionnaire is found in a blank prepared for use with adults by The Psychological Corporation, entitled "Aids to the Vocational Interview." [1] The study of interests is combined with the Educational History and Work History, in which those subjects and tasks liked and disliked are recorded. A special schedule (No. 7) calls for avocational interests "since leaving school," in "college," and in "secondary school." An opportunity is given the subject to state special talents and interests (schedule No. 8). The study of occupational interests is made a separate schedule (No. 9) which is given here in complete form.

The manual tells us that the schedule of occupational preferences proceeds from

Kinds of Work, which allows for a choice between pairs of activities, through subdivisions in twelve fields of occupations, to illustrations of work interests, and finally to a tentative choice of five occupations. The main part of this page, b, listing fields of occupation, is arranged after the manner of the blanks of Freyd and Strong; i.e., stating whether or not one likes, dislikes, or is indifferent to these fields. Since this is by no means a complete list of occupations, and is intended only to be suggestive, space is left under each of the twelve groups for the applicant to add his own special interest. Besides aiding the interview, this part of the blank serves two purposes: first to the applicant, suggesting a wide variety of possibilities within general groupings, about which, with the help of the counselor, he may inform himself; and second, to the counselor for later research purposes.

The applicant is then asked to indicate by illustration, first a few specific jobs which he knows he likes from experience; and second, a few others which, although he has not tried them, he thinks he might like. He then gives, in order of preference, a tentative choice of not

[1] Leahy, A. B., Achilles, P. S., and Bingham, W. V.: "Aids to the Vocational Interview": Manual of Instructions (for Counselors Using Form A), 4 pp.; Record Form A for Adults, 8 pp., New York, Psychological Corp., 1929.

TO BE FILLED IN BY APPLICANT

9. OCCUPATIONAL PREFERENCES

a. KINDS OF WORK. In each of the following pairs check the kind of work which you prefer.

.....skilled manual work	.....broad planning	.....work with people { non-selling..... selling.....
.....primarily mental work	.....attention to details	.....alone
.....supervising people	.....regular schedule	.....with abstract ideas or symbols
.....under supervision	.....irregular periods of work	.....with concrete things or mechanisms

b. In the following GENERAL FIELDS, indicate after each subdivision whether you would like that kind of work or not. Disregard considerations of salary, social standing, advancement, etc.

Draw a circle around L if you like that kind of work.

Draw a circle around I if you are indifferent to that kind of work.

Draw a circle around D if you dislike that kind of work.

Add any others that may interest you. This list is merely suggestive.

Agriculture

Farming	L	I	D
Forestry	L	I	D
Horticulture	L	I	D
.....	L	I	D
.....	L	I	D

Art

Architecture	L	I	D
Decoration	L	I	D
Design	L	I	D
Drama	L	I	D
Music	L	I	D
Painting	L	I	D
Sculpture	L	I	D
Writing	L	I	D
.....	L	I	D
.....	L	I	D

(Divisions of Engineering):

Aeronautical	L	I	D
Civil	L	I	D
Electrical	L	I	D
Mechanical	L	I	D
Mining	L	I	D
.....	L	I	D
.....	L	I	D

Government

Administrative	L	I	D
Clerical	L	I	D
Supervisory	L	I	D
Technical Services	L	I	D
.....	L	I	D
.....	L	I	D

Industry

Accounting	L	I	D
Designing	L	I	D
Operating	L	I	D
Production Control	L	I	D
Personnel	L	I	D
.....	L	I	D
.....	L	I	D

Professions

Journalism	L	I	D
Law	L	I	D
Library	L	I	D
Medicine	L	I	D
Ministry	L	I	D
.....	L	I	D
.....	L	I	D

Commerce

Accounting ..... L I D
Advertising ..... L I D
Banking & Finance ..... L I D
Merchandizing ..... L I D
(Others as):
Book Shop ..... L I D
Real Estate ..... L I D
..... L I D
..... L I D

Education

Administration ..... L I D
Research ..... L I D
Teaching ..... L I D
..... L I D
..... L I D

Engineering

Construction ..... L I D
Design ..... L I D
Management ..... L I D

(Divisions):

Legislative ..... L I D
Executive ..... L I D
Judicial ..... L I D

Military ..... L I D
Naval ..... L I D
Foreign Service ..... L I D

Federal ..... L I D
State ..... L I D
Municipal ..... L I D

Political ..... L I D
Non-Political ..... L I D

Household Management

Advisory ..... L I D
Dietetics ..... L I D
Research ..... L I D
Family ..... L I D
Institutional ..... L I D
..... L I D
..... L I D

Science

Exploration ..... L I D
Laboratory practice .... L I D
Research ..... L I D
..... L I D
..... L I D

Social Work

Administration ..... L I D
Case Work ..... L I D
Organization ..... L I D
Psychiatric ..... L I D
Recreation ..... L I D
..... L I D
..... L I D

Transportation

Aviation ..... L I D
Automotive ..... L I D
Navigation ..... L I D
Railway ..... L I D
..... L I D
..... L I D

c. Mention a few specific jobs, or samples of work in any of these occupational fields (such as designing a boat, investigating an appeal for poor relief), which *your experience* has taught you that you like to do best.

d. List any other such sorts of work which you think you would like very much, *even though you have not tried them.*

e. Make a tentative choice of five occupations in which you could be reasonably successful and happy, and list them in order of preference 1..... 2.....
3..... 4..... 5.....

more than five occupations in which he thinks he might be reasonably happy and successful. This selection is often revised after all the material has been talked over with the counselor.

In the use of the Aids to the Vocational Interview it is suggested that the examiner note whether there is any relationship between the avocational interests and the likes and dislikes expressed in the educational and work histories. There might also be a relation between educational subjects liked or disliked and vocational tasks liked or disliked. Various other consistencies and inconsistencies in interests may be noted in the process of understanding the subject's interests.

THE QUALITATIVE ANALYSIS OF INTERESTS. In the interview a qualitative analysis of interests is often attempted. The interest inventory has been used by clinical workers for this purpose in a similar manner to the application we find of it in the interview blank shown above. A glance at the items marked in an inventory will suggest trends of interests. Where there is continual indifference or dislike of people this will show in the marking of the inventory. Where there is preference for scientific subjects this can be gathered from a brief review of the blank. Note the record of occupational likes and dislikes of a person marking Cowdery's inventory (Subject 41).

SUBJECT 41. LIKES AND DISLIKES OF MR. "M," MARKING COWDERY'S INVENTORY

Actor	L	Landscape Gardener	L
Architect	L	Librarian	L
Artist	L	Locomotive Engineer	D
Astronomer	D	Machinist	D
Auctioneer	D	Magazine Writer	L
Auto Repairman	D	Musician	L
Cashier	L	Newspaper Reporter	L
C.P.A.	L	Novelist	L
Chauffeur	D	Office Clerk	L
Chemist	L	Orchestra Conductor	L
Clergyman	L	Photographer	L
Factory Worker	D	Poet	L
Farmer	D	Politician	D
Fisherman	D	Printer	D
Floorwalker	L	Private Secretary	L
Hotelkeeper	L	Rancher	D

Scientific Research Worker..	L	Street Car Conductor	D
Shop Foreman	D	Surgeon	D
Social Worker	D	Teacher	L
Statistician	L	Toolmaker	D
Stock Broker	D	Typist	D

There are suggestions of the fields of interests in this list of likes and dislikes. One can imagine this individual as afraid of physical pain, avoiding people with dirty clothes, disliking soiled hands and nails, and objecting strenuously to rough language and uncultured ways. He is very esthetic, from this picture, and his interests are defined by the list as in the artistic and literary fields. He doesn't like social workers, is indifferent to missionaries, but likes the clergymen. It would seem that here is a conflict. But the minister is only heard in the pulpit in cultured expression, while the social worker is a nuisance to him, and the missionary is too far away to be noticed. He likes the landscape gardener, is indifferent to the ordinary gardener, and dislikes the farmer, all pointing to the liking of the esthetic and dislike of dirt and farm odors. So one might go on securing leads for a discussion of interests in the interview.

The occupational likes and dislikes are valuable in this way. Of similar assistance in a qualitative understanding of the individual's interests are his varied and general likes and dislikes, for people, sports, books, countries, amusements, animals, and educational subjects. Fordyce (*3*) gives an illustrative case of the use of the interest inventory for its qualitative suggestions. (Subject 42)

SUBJECT 42. J. W. S. MALE, AGE 16, SECOND YEAR HIGH SCHOOL
(Abilities record in mechanical drawing and shop work excellent. Mental age, 14; I.Q., 85)

Likes and Dislikes Record, as Shown in Strong's Vocational Interest Blank

1.	Auto Salesman	D
2.	Bookkeeper	D
3.	Cashier in Bank	D
4.	Civil Engineer	L
5.	Factory Worker	L
6.	Inventor	L

Likes and Dislikes Record, as Shown in Strong's Vocational Interest Blank

7.	Machinist	L
8.	Musician	L
9.	Physician	L
10.	Real Estate Salesman	D
11.	Sculptor	L
12.	Specialty Salesman	D
13.	Surgeon	L
14.	Bookkeeping	D
15.	Chemistry	D
16.	Manual Training	L
17.	Nature Study	L
18.	Physiology	D
19.	Zoology	D
20.	Making a radio set	L
21.	Interviewing men for a job	D
22.	Writing personal letters	D
23.	Entertaining others	D
24.	Auto Repairman	L
25.	Carpenter	L
26.	Chemist	D
27.	Draftsman	L
28.	Farmer	D
29.	Life Insurance Salesman	D
30.	Manufacturer	L
31.	Office Clerk	D
32.	Private Secretary	D
33.	Retailer	D
34.	Social Worker	D
35.	Statistician	D
36.	Traveling Salesman	D
37.	Botany	D
38.	Mathematics	D
39.	Mechanical Drawing	L
40.	Physics	D
41.	Shopwork	L
42.	Operating Machinery	L
43.	Interviewing prospects in selling	D
44.	Writing reports	D

The following qualitative analysis of this subject's interests is made in relation to tests of abilities administered to him. (*3*)

The above display indicates that J. W. S.'s interests lie mainly in the field of mechanics; the fact that he has been very successful in shop

work and that he has not only built many radio sets but that he repairs the radios of the neighborhood confirms the diagnosis of the interest blank.

J. W. S. had a mental age of fourteen as shown by Terman's Individual Test, giving him an I.Q. of 85, which precludes him from the professions; his lack of the qualities essential for a physician and surgeon was shown in his dislike in school for all scientific subjects except nature study, although in these subjects he had skillful teachers; negative guidance here was further indicated by his low scores in tests 6, 9, 15, 16, and 22.

The responses of the interest blank do not point to clerical work as he gives a negative response in items 2, 14, 31, 32, 35, and 44. It would be unwise to guide him into clerkship as shown in his low scores in tests 1, 6, 7, 8, 11, 12, 13, 22, 23, 25, and 26. Negative interests as shown in the following items of the interest blank foreshadow little liking for salesmanship: 1, 10, 12, 22, 23, 29, 33, 34, 36, and 43. Nor do tests 1, 4, 8, 19, and 22 show aptitude for business pursuits. His temperamental and personality traits would further militate against salesmanship; but items 4, 5, 6, 7, 16, 20, 24, 25, 27, 30, 39, and 41 of the interest blank show marked preference for mechanical pursuits. This diagnosis is still further strengthened by high scores made in the following tests: 6, 9, 14, 16, 17, and 18. J. W. S.'s teachers were advised to give him every subject in the high school that would contribute to his mechanical training and then to encourage him to enter one of our better technical schools for the completion of his training. The particular phase of mechanical work to be selected will undoubtedly become clear as he progresses in his preparation.

A qualitative analysis of interests such as this contributes to forming the Own Story, which is, of course, never complete. Additional contributions to it may be gained from conversations with the subject as the examination proceeds. The Own Story shows what the subject considers to be his relations to the world. From this point on the psychological examination is a search for the facts of measurement.

THE MEASUREMENT PROGRAM. The estimation of present interests involves the use of estimates, rating scales, inventories, and objective tests. The earlier chapters of this book have been concerned with the technique of securing information by means of these measures, along with an analysis of their value. In the cross-section study of interests, examination schedules would be made up according to the chronological and mental age of the subject, according to his training, and according to the time allowed for this examination.

A MINIMUM SCHEDULE OF TESTS AND MEASURES. The psychological examination of interests of an adult seeking vocational adjustment should contribute, in various degrees of completeness, the following facts:

1. *Ratings by the Subject* of his present vocation and his desired vocation in relation to all others.
2. *Estimates by Others* of leading vocational, educational, and social interests.
3. *Measures of Subjective Interests,* particularly in the field of the subject's vocation and in the field of his desired vocation.
4. *Measure of Objective Interests,* particularly in the field of the subject's vocation and in the field of his desired vocation.

Of course, different conditions determine the information required in the interest examination. The following minimum schedule is arranged for the interest examination of adults, and those with considerable occupational experience, who are seeking a better adjustment of their vocational interests.

A Minimum Schedule for an Adult

1. Kitson's Vocation-to-Vocation Rating Scale of Interests.

This would be used to secure ratings by the subject of degrees of interest in his present vocation, and in his occupational choice if different.

Kitson's rating scale is described in Chapter II, pp. 53-5, where norms are given for teachers and nurses. These norms suggest the average interest situation in various other occupations. The scale can be adapted for use in any vocation based on the description given.

2. An Interest Estimate Blank.

This might be used to secure two estimates of leading interests from employers, parents, teachers, or friends.

Such a blank can be prepared with three or five spaces for ranked interests in various fields, similar to the following:

Interest Estimate Blank
of

Name ..... Address .....

Kindly fill in the following spaces with the interests which seem to you to be foremost in the life of the person whose name appears above.

Vocational	*Educational*	*Social*
1st	1st	1st .....
2nd	2nd	2nd .....
3rd	3rd	3rd .....

Signed:

.....

Sometimes a list of aversions is requested along with this request for estimates of interests.

3. Strong's Vocational Interest Blank.*

This inventory should be scored at least for the present vocation, and the occupational choice if different.

Strong's Vocational Interest Blank is described in Chapter III, pp. 81-4, and 22 occupational scoring keys are described in Chapter IV, pp. 122-40. Instructions for administering the inventory are on the blank. Inventory and scoring keys are published by the Stanford University Press, Stanford, California.

A general scoring service using the Hollerith machine is now established under the direction of P. J. Rulon at the University of Minnesota, Minneapolis; at Columbia University, New York City, under the direction of Ben Wood; and at Stanford University, Stanford, California, under the direction of E. K. Strong, Jr. The scoring process by means of the Hollerith machine was worked out at the University of Minnesota by Rulon and Arden. (9) With this outfit 20 professional scores can be secured by an operator per hour as against 5 by the best individual scorer.

4a. For Men: O'Rourke Mechanical Aptitude Test, Junior Grade.

This test is published by the Educational and Personnel Publishing Company, Washington, D. C. Administration instructions are included with the test which is described in Chapter IX, pp. 270-2.

* Manson's "Occupational Interest Blank for Women" and her scoring keys for women clerical workers, teachers, and trained nurses, should be useful in the examination of the interests of business and professional women. This in-

4b. For Women: McHale's Vocational Interest Test for College Women.

This test is published by The American Association of University Women, 1643 Eye Street, Washington, D. C. The test is described in Chapter IX, pp. 274-5.

A minimum schedule for the interest examination of a child (ages 8 to 16) would, of course, be somewhat different. The self-rating (No. 1) would necessarily be omitted. In the interest examination the estimate blank should have as wide circulation among teachers and friends as possible. Strong's Vocational Interest Blank with its occupational scoring keys is of doubtful value at these early levels, since it was developed upon adult interests. This inventory might be used in an experimental manner with children 12 to 16 years. Among the objective measures the O'Rourke Mechanical Aptitude Test can also be used for ages 12 to 16.

The point of view of adjustment is different at these ages from what it is at the adult level. At the adult level the emphasis is upon vocational adjustment. Here it is upon educational adjustment. Of course, at both levels a general social adjustment is important. We are interested in securing the following information in the interest examination of children (ages 8 to 16):

1. *Estimates by Others* of leading vocational, educational, and social interests.
2. *Measures of Subjective Interests,* particularly in the field of the subject's educational training and in the field of the subject's educational choice.
3. *Measures of Objective Interests,* particularly in the field of the subject's educational training and in the field of the subject's educational choice; also of play activities.

Information upon social interests would seem to be valuable in understanding the general development of interests, but neither in the study of interests nor abilities has this field been sufficiently distinguished from that of the educational to furnish a separate measure. A minimum schedule for the interest examination of children follows:

ventory and 10 scoring keys are described in Appendix V, and are published by the Bureau of Business Research, 208 Tappan Hall, Ann Arbor, Michigan.

A Minimum Schedule for Children (Ages 8 to 16).

1. An Interest Estimate Blank (similar to the one suggested in the minimum schedule for use with adults).

This might be used to secure as many as four estimates of leading interests from parents, teachers, or friends.

2. Garretson's Preference Questionnaire.

This inventory might be scored for "Commercial Preferences" and "Technical Preferences." It is described in Chapter III, pp. 87-8, and the scoring keys in Chapter VII, pp. 252-6. Garretson's inventory is given by the author in complete form (*6*, 10-17) along with the scoring keys (*6*, 30-37).

3a. Wyman's Free Association Test of Interests.

This test might be scored for intellectual and activity interests. It is described in Chapter IX, pp. 293-307 (Test on p. 294). Scoring keys, which total approximately 120 typewritten pages, can be secured from Dr. J. B. Wyman (Pilcher), University of British Columbia, Vancouver, B. C., Canada.

3b. Lehman's Play Quiz.

The administration of this test is described in Chapter IX, pp. 318-21. Copies can be secured from the author, Professor H. C. Lehman, Ohio University, Athens, Ohio.

THE INTEREST PROFILE. The interest profile can be of assistance in the prognosis and in making recommendations. It is probably unwise to attempt to use the measures of interests to indicate more than three qualities of feeling in the profile: (1) an interest, or like; (2) an indifference; (3) an aversion, or dislike. The future may bring a profile in percentile degrees, as in the measurement of abilities, but, today, in the measurement of interests there is probably a higher validity in allowing for greater error. This is particularly true when the results of other sources than tests are included, for example, interests from autobiography, Own Story estimates, parents' estimates, friends' estimates, rating scale results.

A profile of an adult in the early twenties is given here, which may be suggestive in assembling the various records

Interest Profile of [2] .....

Sex: *M*; Age: *21*; Educ: *H. S., 3 years*; Occupation: *Assistant Bookkeeper*; Ability Measures: *Army Alpha, 120*; ....

Interests (Likes)		*Indifferences*		*Aversions (Dislikes)*	
		EDUCATIONAL INTERESTS			
Commercial Wk.	Ab.	English	Ab.	x Languages	Own Sty.
x Mathematics	Ab.	Science	Ab.	Latin	T. Est.
x Accountancy	Own Sty.	Geometry	Own Sty.	French	P. Est.
x Science	Inv. (Strong)	Shop Work	Own Sty.	Literary	
Commercial Subjects	Inv. (Strong)	Science Subjects	Inv. (Strong)	Subjects	Inv. (Strong)
Commercial Wk.	T. Est.				
Commercial Wk.	F. Est.				
x Arithmetic	P. Est.				
		VOCATIONAL INTERESTS			
Bookkeeper	Ab.	Engineering	Own Sty.	Medicine	Ab.
Newspaper Office	Ab.	Secretarial Wk.	Own Sty.	Lawyer	Ab.
x Bookkeeper	R.S. (Kitson)	Business	R.S. (Kitson)	x Office	
x Accountant C.P.A.	Own Sty.	Teaching	Inv. (Strong)	Routine	Own Sty.
Executive Oc'p.	Inv. (Strong)	Lawyer	Inv. (Strong)	Engineering	Inv. (Strong)
Public Accountant	Inv. (Strong)	Advertiser	Inv. (Strong)	Real Estate	
Personnel Man	Inv. (Strong)	Mechanics	I.T. (O'Rourke)	Salesman	Inv. (Strong)
x Purchasing Agent	Inv. (Strong)	Insurance		x Vacuum	
Clerical Work	E. Est.	Salesman	Inv. (Strong)	Cleaner	Inv. (Strong)
x Accountant	P. Est.			Salesman	
Advertising	F. Est.				
		SOCIAL (GENERAL) INTERESTS			
Athletics (Spectator)	Own Sty.	Girls	Ab.	Parties	Ab.
Stocks and Bonds	Ab.	Girls	Own Sty.	Routine of	
Writing Letters	Ab.	Parents	Own Sty.	Living	Own Sty.
Drawing Plans	Ab.	x People	F. Est.	x Girls	P. Est.
Reading	P. Est.	x Church	Ab.	Social Relations	I.T. (Ream)
Investments Column		x Peculiarities		x People	Inv. (Strong)
of Newspaper	E. Est.	of People	Inv. (Strong)		
Night School Adv.	F. Est.	Most Social			
Magazines	Inv. (Strong)	Amusements	Inv. (Strong)		

Abbreviations: Autobiography (Ab.); Employer (E.); Estimate (Est.); Friend (F.); Information Test (I.T.); Inventory (Inv.); Occupations (Oc'p.); Own Story (Own Sty.); Parents (P.); Rating Scale (R.S.); Teacher (T.); Work (Wk.).

[2] Hypothetical to include measures of minimum schedule.

secured in the psychological examination of interests. The interests of this subject are classified into three major fields of activities: Educational, Vocational, and Social. The source of the information is given. Abbreviations are explained below and dominant interests and aversions are marked with an "x".

This profile offers conflicting evidence. But there is usually greater inconsistency between the measures used to understand the interests of a subject than is found here. Consistency in the measures in any field of mental activities is not always present. This, we assume, is the fault of the measures, and it is the reason why as many measures as time will permit should be used in the psychological examination of interests.

The profile is the basis for prognosis and the recommendations of training. According to the profile given here, which is of a subject of high average ability and training, there is a consistent interest in the higher clerical branches and there are aspirations to become a certified public accountant. This subject's interests are professional rather than business, and he is narrow in his interests in almost an abnormal way. He is averse to linguistics and people, and indifferent to mechanics. He has few social interests.

Recommendations for retraining, based upon this prognosis, would not include any definite change in the genetic development of interests, but rather a broadening of social interests, which the autobiography and estimates of associates indicate have always been extremely narrow. This retraining program would necessarily have to have the cooperation of the subject to succeed. Strong feelings have evidently been developed in relation to social situations. He has a negative emotional reaction to the "routine of living" which is opposed to his interest in the details of accountancy. All the information suggested in the profile would be discussed with the subject. He would be encouraged in his specialized interest in accountancy. The need for an all-round development of interests would be emphasized insofar as the necessities of his specialization will allow, so that he may have the interests which make for pleasant intellectual, mechanical, and social relations.

THE USE OF THE PSYCHOLOGICAL EXAMINATION OF INTERESTS. We now come to the question of what we are going to

do with the results of a psychological examination of interests. The psychological examination of interests involves prognosis just as does the psychological examination of abilities. It involves prediction from the results secured. It also involves recommendations for training or rehabilitation.

The traditional use of interest judgments has been to predict future interests, present or future abilities, and success or achievement. Recommendations for developing an interested life seem not to have been attempted.

Differences exist in the point of view of research in this field. Some investigators wish to use the inventory as a predictor of abilities—as, in fact, another measure of abilities. This attempt has failed. Specific interests are not predictors of specific abilities, although they may frequently be found together. This, of course, is unimportant when we have plenty of well-established measures of abilities.

Other investigators aim at achievement and hope to find an influence of interests upon achievement. While it would seem that this relation is present, it is not as high a relation as that found between abilities and achievement. It seems probable that interests do determine achievement slightly, and particularly over a long period of time, but the extent of this relationship is still to be determined.

Abilities are correlated with achievement and success, and an adjustment of the individual according to his abilities is valuable to industry, in education, and to society, as well as to the person himself. The question is raised: "If interests are *not* correlated with success and achievement to a degree valuable for prediction, of what value is it to measure them?" This question has all of the philosophy of nineteenth century efficiency behind it. A measure of interests is valuable for its own sake, to permit a more happy adjustment to life. The happiness of the individual grows out of his interests. According to some, the measurement of interests may be more valuable to the individual in his adjustment than the measure of abilities. If one were a social philosopher, one might say that the ability measure belongs to society, the interest measure to the individual.

Industrialists, educators, and soldiers have long recognized

a factor of group life, in achievement and success, as morale. They have recognized this as having all the characteristics of feeling, such as lack of permanence, found in the study of interests. But they have placed their fingers on it as most important, though difficult to maintain, in continued, or long period, achievement and success, as well as in certain spurts of activity where there is need of what seems a superhuman effort. It may be that interests have little to do with ordinary and immediate achievement, but that they do influence long period achievement and that they are of primary importance to the accomplishment of difficult tasks. A refinement of statistical evaluation of test results will be necessary to establish this second value in the psychological measurement of interests.

The real value of the examination of interests lies in its measure of development. It is a measure of an aspect of personality separate from anything else. It is a measure of individual interests, morale, and potential happiness, of which the essential quality is pleasant feeling. A measure of interests is valuable, not because from it we can predict abilities, not because from it we can predict achievement or success, although we may incidentally do so, but because it is a measure of the individual's feeling life in a certain environment. A knowledge of the individual's interests facilitates an adjustment of the individual with respect to his feeling life, just as knowledge of the individual's abilities assists in adjustment of the individual in educational and vocational efficiency.

Now we have an answer to the question: "What are we going to do with the interest examination results?" We are going to recommend an interest adjustment and an interest development, as complete as possible, within the scope of the individual's abilities, and expect thereby that social efficiency and individual happiness may result.

RECOMMENDATIONS OF RETRAINING. Recommendations of training and retraining of a subject should be based upon the psychological examination of interests as well as upon the examination of abilities. It is highly probable that the development of interests is more important to the individual's health and happiness than the development of abilities. Recommen-

dations of retraining of interests would consider general development as well as a specialized development. All of the facilities of education are available for the stimulation of this development. (*1*)

When the psychological examination of interests is complete, or as complete as time will permit, the subject is shown what his relation to society is. He is given the prognosis. This raises problems of individual encouragement and discouragement. However, unless the prognosis is made available to the subject there is no basis for training. The situation must be accepted by the subject and the motivation aroused for the interest development that the prognosis indicates is desirable.

UNWARRANTED EMPHASIS UPON SPECIFIC INTERESTS. Testimony of vocational counselors has presented to us many cases of the unhappy divorce of the specific occupational interests and the abilities of the individual. As much as the rest of us, the young person considering his career may be the victim of word magic. The name of an occupation, or some customary phrase used in regard to it, may allure him so that he will become convinced that he can be happy in no other work. If it is true that he can be happy in no other work then the problem becomes not one of his interests but of his pathology, and the young man is the victim of an obsession.

Young men have been known to have other obsessions, at certain ages and under kindly moons. One particular girl becomes to him his ultimate necessity, but it is extremely improbable that his judgment will be accepted as authoritative by society. Almost any older person will tell the disappointed youth that there will be other maidens, other springs. It is striking that much more prestige attaches to interest in an occupational pursuit than to sexual objects of interest. Some of this is doubtless due to the fact that we are still compelled to give counsel upon such inadequate bases. Failing knowledge, magic remains the means for conquering the universe, to which mankind invariably resorts.

We do not, except in our more backward states, resort to supernatural methods of bringing rain to the parched ground, but in the crisis of an occupational decision interests are fre-

quently introduced as the x-element that becomes decisive by virtue of faith alone. Interests are put forward as what the child "really wants," what he "really is." The more we hope that there is a fundamental basis for the specific interests, the more inclined we are to seize upon the child's expression of interest as the key to his personality and the Ariadne thread by which he may safely win his way through life's difficult maze.

So strong is the prestige still attaching to the interest expressions that the reports of vocational experts customarily show a tinge of apology when a case is related in which it seemed necessary to divert the subject from the path toward which his interest appears to direct him. A marked disharmony between the child's interests and his possibilities of development should lead to a customary diagnosis of the unwisdom of allowing the interest expression to shape the child's future. The records of vocational guidance bureaus will undoubtedly present other cases similar to the one offered by Viteles, which follows (*11*):

> In some cases it may actually be necessary to attempt to divert interest toward another and a more desirable vocation. An extreme example of this is to be found in a case to which I have had frequent occasion to refer—a boy of nineteen, a skilled mechanic, with a grammar school education and an I.Q. of 85, who as a result of a chance remark by a surgeon treating him for frost bite, developed a desire to enter the surgical profession amounting almost to an obsession. Interest was intense enough to lead the boy to give up his job and to enroll as a student in the high school, attempting to support himself by working as an errand boy after school hours. Guidance in this case had to take a form of diversion to another and more suitable occupation. In this particular case a sort of transfer or sublimation of interest was effected by arranging for training in the occupation of undertaker, in which our last report showed the boy to be well adjusted. This is an unusual case, chosen by reason of its very unusualness to indicate the possible effect of the single factor of interest in the vocational guidance of an individual.

This case is of value in showing the casual nature of the origin of vocational interests, as well as the chasm which may yawn between the individual's desires and his possibilities.

It is the developmental nature of interests rather than the

specific interests that is important. Specific interest expressions can always be regarded skeptically. Unwarranted emphasis has been placed upon the specific expression and there has been disregard of the continuing stream of interests which is alone significant.

ADJUSTMENT THROUGH INTERESTS. All our lives we are seeking an adjustment through a balancing of the various interests which come to us. The man with few interests, who draws practically complete satisfaction from one or two outlets, is easily adjusted so long as society does not interfere with his pursuit of the object of his interest. The miser is made happy by the sight of his pile of gold; the religious fanatic by impressing his message on the world; the Bluebeard by killing his wives.

But society has always shown a tendency to suspect the individual who lives in the expression of a sharply limited number of interests; there is always a danger that this limitation will make him unresponsive to many social appeals upon which the life of the group depends. In the early part of this century, America appeared to applaud the single-mindedness of the business man, whose sole objective in life was the amassing of a fortune, but today the conventional Babbitt has been derided in many forms of literature. While the man who finds his satisfactions through one object of interest may be respected for his determination, there is a general tendency to regard the man of many and balanced interests as the more desirable human being.

Most of us have a large number of interests and suffer from time to time from the impossibility of combining them into a balanced whole. In spite of this we continue to try to make the best adjustment between these interests. As time is limited and life is short, we have to neglect certain things and push certain others. We may even feel in times of stress that we have to neglect our greatest interest for lesser ones. This is partly because of the glamour that seems to hang over things at a distance, and partly from a lack of understanding of the nature of interests. Whatever we have to do may contribute its share of satisfaction to us, unless we allow prejudice and emotional rebellion to prevent this. Interest is like appetite in

the phrase "l'appetit vient en mangeant." Interest grows from being interested. Tasks which are obnoxious to us are usually slighted in the performance; our attention is seldom wholly given to them and so we miss a great part of the nature of the task. The worker who feels that a job is beneath him is prone to disregard the very feature which might make it interesting. A little scientific curiosity will reveal a variety of aspects to the accomplishment of a very simple task; the deeper one gets into almost anything the greater fascination he tends to find in it. This is a very fortunate provision and one often overlooked by theorists concerned from the outside with the monotony of the tasks to which most of mankind, if not all, is committed for the greater part of life. Good workers result from interests and interests develop with good work.

But no one task is determined by a single interest. In play, as in work, we attach value to what we do, not only according to the intrinsic satisfaction of doing it but also according to the rewards (prestige, money, admiration, and the like) which the group allows for doing it. Intrinsic interests in the task are capable of a great deal of development, if these other interests are not contending with it. Workers whose social and economic status are satisfactory, according to their standards, will be found very frequently showing absorbed interest in some task which, viewed from the outside, appears exceedingly dull. There is a technique of any activity, the mastery of which brings its own satisfaction. Particularly in mechanical tasks, where definite rhythm is established, the interests which can be developed are quite remarkable when viewed from the standpoint of the individual who has not participated in the activity.

Thus there are two distinct aspects to this question of interest adjustment. A variety of objects and activities is required if we are to fit the social ideal and if we are to experience the richness of contact with many persons under many circumstances. On the other hand, an intensity of interests is required if the particular task is to render us the satisfactions of which it is capable. We attend to that which interests us and we grow more interested in that to which we attend. Each individual has to work out his own formula, his own best balance

between variety of interests and depth of absorption in those interests. To be deeply interested he must attend closely to the activity of the moment; to be richly interesting he must be able to transfer his attention to objects glimpsed upon many far horizons.

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APPENDIX I

HISTORICAL SKETCH OF INTEREST IN EDUCATION AND INDUSTRY

THE importance of interests in mental life was recognized neither by early educators nor by early industrialists. As late and as prominent an educator as Johann Heinrich Pestalozzi (1774) was concerned in education with the development of a well-trained and efficient man and not with the satisfaction the individual would gain. However, Comenius (1658) and Rousseau (1762) took very early the advanced view that education is a matter of individual satisfaction. But education, in the minds of most persons, was for the benefit of the State, and the individual was trained for society and its purposes. This was true with educators among the Greeks and Romans, and this view was largely held down to our present generation. Beginning with Friedrich Schleiermacher (1826) in Germany and stimulated by such workers as Bernard Perez (1878) in France, Wilhelm Pryer (1880) in Germany, G. Stanley Hall (1883) in America, James Sully (1884) in Great Britain, Luigi Ferri (1879) in Italy, and many others, a recognition of the child as an individual capable of, and having a right to, individual satisfactions, including being interested in his activities, gradually dawned upon the advanced nineteenth century civilization.

Industry was more backward than education. It is only recently, within the last decade, almost, following an upheaval in scientific management, that there has been brought about a recognition of the individual worker in industry as an interested person. The old Guilds, by their organization, gave some of this satisfaction to the individual worker. But there was, it would seem, little consciousness of industrial interests as a factor in happiness and production. The new concept of

human efficiency, which says that satisfaction, in the sense of interesting activity, is due the worker as a part of his work, is the product of modern industry. As stated by Poffenberger (*22*), "The ideal of human efficiency would be 'the production of the maximum output of the highest quality in the shortest time, with the least expenditure of energy and with the maximum satisfaction.'" The "scientific manager" learned by experience how indispensable is labor's good-will and cooperation. Failure to appreciate this during the first twenty-five years of his work resulted in determined opposition and costly failures. Today, "Enlightened management makes the best interests of its labor force an integral part of its planning." (*3*)

While the study of interests has only begun and is not as exhaustive as the study of abilities, industry and education have much to profit from the facts that are known. Both education and industry began by ignoring the feeling side of the individual. Education came to consider this factor first in its attempt to achieve a better training for the individual. It came later to recognize the individual's right to be interested. Industry is gradually coming to see that it pays in dollars and cents to treat the worker as an individual to be interested in everything with which he is connected.

Psychology of Interest Applied to Education. Johann Frederick Herbart (*16*) formulated an early theory of educational training based upon interest. He thought of mind as an absorbing force working upon an outside interesting object. The idea of the object with which an individual came into contact became associated with previous ideas of objects. The purpose of education was primarily that of stimulating the spontaneous interest forces in the individual by directing him toward numerous and varied objects. Herbart thought of interest expression as feeling activity in which there follows an immediate intellectual absorption in some outside object, similar perhaps to that found in play. He emphasized the stimulation of a many-sided development of this capacity to be interested, in which feeling offered the initial contact.

After Herbart, methods of training became a process of stimulation of interests. By the beginning of the twentieth

century, interest as a mental capacity had been given an important place in the educational doctrines of all educators. Interest came to be thought of as the mainspring of development. Upon it rested the acquisition of knowledge.

G. Stanley Hall was early interested in industrial education. "Every step of man's marvelous industrial development from the age of stone, bronze, and iron up to wireless telegraphy . . ." has been due, he held, to "interest in the product." (*14*, 199) Interest expression is all-in-all utilitarian. He criticized vocational education for not recognizing the importance of the product, or end-result, to which, he said, interest in the process of achievement should be absolutely subordinated. He might have leveled the same criticism at scientific management. In this connection he called to our attention that the idea of utility is an individual matter and the utilitarian goal differs according to one's development.

Interest in the goal has been emphasized by John Dewey. (*5*, *6*) Dewey thought of an interest as a feeling attachment in a more or less prolonged series of acts allied to a persisting idea, the series being the means of attaining the goal, which is the main interest. The means used in attaining the desired end are temporary interests. These minor goals along the way help to establish the final goal. In educational instruction under this plan, Dewey says that the objects of interest become identified with the self. The more remote the end in time the greater the necessity of the sublimation of the self to the interest goal. "Genuine interest," says Dewey, "is the accompaniment of the identification, through action, of the self with some object or idea, because of the necessity of that object or idea for the maintenance of a self-initiated activity." (*6*, 14)

E. L. Thorndike developed further the theory of interest in education. (*27*, I, 297 ff.) Satisfying or pleasurable stimuli are aids to learning. Annoying or unpleasant stimuli have a contrary effect. Interest, the pleasurable feeling, stamps in the learning. Elsewhere, in considering the problems of efficiency and fatigue (*27*, III, 120 ff.) Thorndike contends that more work is done when the learner is interested and that a feeling of aversion subtracts from production.

There are, then, according to these educational theories, several important aspects to the problem of utilizing interest in educational training. Interest is many-sided in its expression, it is essentially utilitarian, it is attached to a goal idea, and it aids in learning. The significance of interest in training and in a vocation has been stated in most forceful terms by G. Stanley Hall (*15*, 288):

> Did anyone—and this is my chief point here—ever succeed who did not love his work better than anything else? Especially when everything is so intricate and apprenticeship so long as it is today, he who does not so love his work that it becomes play, so that he turns to it rather than anything else, cannot win the prizes of our day. . . . I think that the greatest good fortune that can befall a man is to be able to make as his vocation what he loves to do during his vacation. . . . If there is something that you prefer to do to anything else, that way lies your calling.

Psychology of Interest Applied to Industry. Leadership in the humanizing of the industrial tasks, in making them more interesting, has been taken by The National Institute of Industrial Psychology of Great Britain. In the work of this Institute, from its inception in 1918, there has been a keen recognition of the importance of the worker's satisfaction in his work. Psychological investigations in industry were initiated from this point of view in the belief that greater efficiency would result. The worker is not directly stimulated to produce more. But when obstacles, such as friction, unconscious effects of discontent, worry, the boring and wearing results of long spells of uninterrupted work, ill-arranged positions of materials and working benches are removed, "increased output has invariably been found to follow." (*21*) Here are a few of the editorial comments on the early investigations reported in the Institute's Journal in 1922:

> "It was possible to make recommendations which dispensed with a large amount of needlessly heavy labour, thus increasing the workers' output and lessening their fatigue." *An Investigation into the Tin-Box Industry.*
>
> "Under the new method here described, output increased by over thirty-five per cent, and the workers were unanimous in their appreciation of a considerable saving of fatigue at the end of the day, spon-

taneously expressing to the investigators their gratitude." *An Investigation into the Packing of Chocolates.*

"A noteworthy increase in output is recorded, and the men unanimously expressed their approval of the new methods." *An Investigation in a Coal Mine.*

"By treating the subject from a psychological standpoint, an enormous reduction in breakage has been effected. . . . The workers themselves bear testimony to the greater smoothness and ease of their work." *An Investigation into the Breakage Problem.*

In this work it was considered a part of the task of the industrial psychologist to reduce all unnecessary fatigue and to contribute to the happiness and well-being of the workers. As one speaker said at the Institute dinner in 1924 (*17*):

> It needs to be understood that if a man is happy in his work, you need not worry about increased production. Increased production is something which cannot be *forced* over any long period. But if you make the worker happy and interested in his work, he will produce as much as he humanly can without any spur whatever.

CRITICISM OF THE INDUSTRIAL ENGINEER. Very early, under the leadership of Charles S. Myers, the National Institute showed itself opposed to the attitude of the industrial engineer who was felt to consider men too much as machines. (*20, 21*) Mr. Arthur Pugh, Secretary to the Iron and Steel Trades Confederation of Great Britain (*2*) declared that "there is more production lost as the result of indifferent management, than as the result of indifferent workmanship. . . . Our industrial managers have been trained to control machines, not men; and it is behind this failure that lies a whole history of discontent, dislocation, and strikes, with loss of wealth, production and harm to the community as a whole." Further, it is stated in an editorial to the first issue of the *Journal of the National Institute of Industrial Psychology* in 1922 that the objectives of the Institute are "the promotion of the mental and bodily health and efficiency of every grade of worker. That excellence of work intimately and inevitably depends on the well-being, interest, and suitability of the worker, is not generally recognized." H. J. Welch (*28*) points out the mutual benefit of employer and employee from scientific developments in industry along this line.

> The worker will benefit by better health, less fatigue, more satisfaction in his work and more opportunity to enjoy his leisure hours, also by the immediate and ultimate improvement in his real wages and standard of living. . . . The employer will be benefited by increased outputs and profits, fewer accidents, less turnover of labour, better opportunity to compete in the world's markets, and in many other ways.

In this statement, efficiency is felt to go hand in hand with individual interest and satisfaction.

ENLIGHTENED PERSONNEL POLICY IN THE UNITED STATES. The criticism in foreign quarters of Taylorism and the "One-Best-Way" of the Gilbreths, based upon their lack of consideration of the factor of interest, has been severe. Russian methods are spoken of by a British investigator (*26*) as "out-Tayloring Taylorism." Very few industrial enterprises in this country have followed or retained the methods of Taylor in the organization of personnel. But the quarrel that the industrial psychologist has with the industrial engineer of the older Taylorism school is with method and not with principles. The Gilbreths (*13*) point this out in answer to the British criticism of American materialistic methods. Taylor's basic principles, as Dexter Kimball has shown, "are to be found in every progressive plant in this country." (*18*)

Taylorism in the United States has advanced far beyond the early materialistic efficiency methods of Taylor in the handling of men. While Great Britain was virgin soil for the industrial psychologist, the industrial psychologist in America has been but one factor in the movement of human engineering. In Great Britain he was a pioneer, and the extraordinary results achieved during the early years of the Institute's work are due to a considerable degree to the then backward condition, compared with America, of industrial personnel activities. Robert Bruère points out (*1*) that today "Taylor's mental revolution is proceeding through industry out into the world." Although Taylor thought of the workman in terms of skill rather than of personality it was his development of the technique of acquisition which offered a sound basis for his theory of a surplus which was to be so large that men could stop arguing over its division. His notion that there should be enough surplus to go around is a part of a totally new modern

philosophy of property. His emphasis on developing the means of assuring such a surplus thus opens the way for all the social and human aspects of an enlightened personnel policy. It is safe to say that possibilities of great import were inherent in Taylorism which the originator scarcely glimpsed, a statement that would be true of any genuine innovation in our ways of doing things.

THE EFFECT ON JOB ANALYSIS. Scott and Clothier (*23*, 133) define an occupation or job as "a continuing assignment sufficiently unlike all other assignments that the transfer of an experienced worker to that assignment from another assignment would involve special training rather than simply casual instruction or sufficiently unlike other assignments that the conditions surrounding the performance of its duties involve unusual mental or physical strain, unusual difficulty, or unusual unpleasantness in performance." Job analysis is the gathering and systematizing of all the facts about the occupation.

Early job analysis described and listed the tools and materials, failing to recognize that the job was a functional thing, a man at work. Recent job analysis technique takes this into consideration, that the unit being studied is a man-job relation, what Scott and Clothier (*23*) call a "worker-in-his-work-unit." Strong and Uhrbrock (*25*, 22 ff.) define job analysis as "the search for habits necessarily used by a workman on the job." Practically all job-analyses prior to 1920, either for purposes of personnel selection or vocational guidance, neglected this psychological distinction.

The job-analysis is a correlation of skill and tool-materials, but it should be more than this. It should include not only a description of the habits involved in the occupation, but a statement of human satisfactions, of interests, both those surrounding the occupation and those intrinsic in its operations. Scott and Clothier (*23*, 15-18) show the importance of interests in the job-analysis.

VOCATIONAL GUIDANCE IN INDUSTRY. In industry the view is held even today in some quarters that the individual can be manipulated by management through appeals to his interests. Glenn Gardner speaks of appealing to the man's self-interests which are "a very convenient handle by means of which he can

be effectively manipulated. . . . It is probably true that nine out of ten men can be handled if the appeal is made to the right self-interests." (*12*) This industrial view, which regards the individual as a mechanism that can be manipulated by pulling the proper interest strings, represents a stage through which education has already gone. The Neo-Herbartians were concerned with the time to launch the appeals that would achieve the best education. Industry seems to have gone farther than this in building a manipulation philosophy. If one might know the worker's interests one might do what one wishes with him, and increase production relative to costs in undue proportions. This is a jumping-jack conception of interest, which forgets the important assumption that the worker *is not interested* in such stimulation, particularly over a long period of time.

Actually, the individual must manipulate himself; he must be given the freedom of self-direction and self-choice for the benefit he, business, industry, or society in turn may derive. Many industrial writers have recognized the difference in these two points of view. Sinclair (*24*) conceives of interest as *self-realization,* and while he does not get entirely away from the idea of the employer manipulating the worker by his feelings, he makes some excellent practical suggestions as to how this self-realization may be attained.

Industrial adjustment is a problem both of the worker and of the employer. In this vital relation the employer's problem is becoming more and more envisaged as one of vocational guidance. The employer's good and the worker's good are not always identical, but in many situations they mean the same thing. Emanuel Paterson, let us say, wants the job that will bring him the most satisfaction. The firm wants Emanuel in the job where he will function most efficiently. These two interests are not always identical, but they usually work out in being much the same thing. The aim of vocational guidance, which is to assist the individual into that work from which he will gain the greatest satisfaction, becomes then the aim of the enlightened industrial organization. (*10, 11*)

CRITICISM OF INTEREST AND EFFICIENCY RELATION. The principle has been set forth, particularly in industry and voca-

tional guidance, that an interest adjustment of the worker will result in improved efficiency. The writers from the National Institute point this out in general terms. Kornhauser (*19*) has recently called attention to the fact that the measures of the resulting efficiency are not clearly defined in relation to the interest adjustment. Measurement is being made in various quarters of the relation of rest pauses, monotony, repetitive tasks and so on, to efficiency. This is a tangible measure, but the resulting improved efficiency from a better adjustment is only suggestive that the worker's interests are causative. The improved efficiency may, and more likely may not, be due to an improved interest adjustment, to which credit is given by these investigators. We have not the means at present to determine the influence of the interest adjustment upon working efficiency.

THE ANALYSIS OF WORK INTERESTS. The analysis of work interests has thrown some light upon the influence of interests upon working efficiency. In the school the student may work from love of the subject, enjoyment of the prestige associated with good grades, punishment for failure, or the need to pass in order to secure something desired in the future. In industry the worker may be motivated by joy in his task, by need of his wages, by hope for future advancement, by fear of being laid off, or by yearning to be recognized by his group as the best worker. These interests are different with different persons, and at different times for the same person. The natural desire to escape punishment was formerly much more utilized than at present in keeping up the level of efficiency both in the school and in the shop.

These interests in personal recognition developed a rare technician out of a girl cashier who was nothing more than a good worker; chance words of praise brought out an immediate response; her record for the day shot up; when she was praised for this it shot up again and again until now she is pointed out as the champion worker; she is known everywhere as the best her department has ever produced and she keeps right on improving her record. She has attained a skill on her job and may justifiably be compared with that of leading players in

amateur sports, and it is quite clear that her interests are the same as theirs.

By vocational or educational interests we mean not merely the interests in the specific tasks of one's job; these may not be a part of one's vocational interests, and in most cases they are but a small part. Vocational interests are all the objects and activities associated with one's vocational life. In the inventorying and measurement of interests the point of view has been taken that all factors are involved in one's vocational or educational interests. Not only is the subject matter of an educational course a group of educational interests, but so is the instructor, the books available, and the morale of the group being instructed. Likewise, in the vocation it is the many factors surrounding that vocation, making it a field of self-realization for the individual, which determine the degree of interests.

Early Studies Analyzing Work Interests. It is often said that one-half of the workers in industries of this country are dissatisfied with their work. A few scientists, economists mostly, have held that the larger proportion of the work of the world is and must remain uninteresting. Work is considered to be inherently unpleasant and destined to remain so. Industrial unrest, lack of interest and dissatisfaction are due to this fact, and a frank recognition of it is considered essential. This is one philosophy of work, and, according to this view, the remedy is thought to be the reduction of working hours and the increase of returns from the work so that human satisfactions may be secured through outside interests. The personnel policy of Henry Ford appears to be based upon this idea, that the work of the world is for the most part and necessarily monotonous, and that the only way out is to reduce the hours devoted to work and increase the remuneration through efficiency methods for leisure time enjoyment.

Henry S. Dennison (*4*), on the other hand, holds a contrary view, that the character of a man's work is determined by his job, that work and leisure are part and parcel of the same, and that the problem of industry today is to develop an industrial organization of men interested in their vocation because it satisfies the driving forces of their lives. Numerous devices have

been offered to remedy the lack of interest in work, such as incentives, wage schemes, welfare work, music, rest pauses, part ownership, and so on. Competition, rivalry, pride, originality, inventiveness, leadership, individuality—interest—are appealed to in this manner. This is the opposing philosophy of work.

Both these views recognize in the interest experiences of the individual an essential factor to be considered in work. It is possible that these are not opposing views, that one view only relates to the job tasks, the human reactions to the materials and tools of the job, and that the other has to do with the broader problem of interests in one's vocational life in the large.

Absence of Interest in Occupational Tasks. It is possible that the average worker is not interested in the occupational tasks of his job, but it is hardly conceivable that the average worker is not usually interested in the vocational activities which take up altogether a large proportion of his life. It is quite conceivable that he would wish to better his position, yet not give up the major activities of his life. To raise a psychological question: Absence of feeling in carrying on the tasks of daily work may be the natural condition; a lack of feeling accompaniment to the skillful expressions of the job may be the situation under which most of the work of the world is carried on. It is possible that the habitual expressions of ability are performed more skillfully with an absence of feeling and that absence of job interests is the desirable condition. Pleasant feelings in relation to the tasks of one's job may not be what one should usually expect, but rather indifference, and the absence of feeling may be suggestive of efficiently working habits. That occasions do exist when we cannot estimate that our experience is pleasant or unpleasant has been shown to be true by experimental psychology. The efficient machinist doesn't work overtime because the work gives him pleasant feeling. He does it because of other interests. The skillful mechanic does a skillful piece of work because he has superior habits of workmanship, not because he derives any great amount of pleasure during the task. It is possible that one's vocational interests are more usually the

factors surrounding the job—personnel relations, prestige, recognition of accomplishment, and so on.

However, the interests or work-feelings are there as a part of the total working situation. The satisfaction of the worker is the total satisfaction of his life. There is not a job part, a family part, a trade union part, etc. Many a business man's day has been ruined by a bad shave. Many a skillful worker does bad work through the unpleasant feelings of jealousy and envy. A family quarrel, a sick child, an overbearing boss, can upset the work of the day. The feeling of the interests and aversions is diffused, and while it may not be the accompaniment of the working task intrinsically, it is a part of the worker's attitude in his vocational environment.

STUDIES OF THE PROBLEM. An early study of this problem was made by Joseph K. Folsom. (*7*) Reports of the chief interests responsible for vocational choice were secured from 206 eminent men selected from *Who's Who in America*. The results gave intrinsic vocational interests a total of 47 per cent of all those given. A second study by Folsom (*7*) of 155 upperclassmen in a small college gave intrinsic job interests a total of 46 per cent. The two groups studied by Folsom were not under economic pressure for necessities, which may have been an influence upon these results.

A questionnaire study of 500 workers (*8*) throws further light upon the problem of whether or not interest in one's vocational task is the natural and to-be-expected thing. Of this group of workers representing more than one hundred occupations, approximately forty per cent indicated that they were dissatisfied with their present vocation, that they did not enjoy doing this work better than any other, and that they would prefer doing something else. There appeared to be no occupational, educational, or age group in which the occupational task interests are more marked than elsewhere. All but eleven per cent of the group saying they were dissatisfied with their present vocation preferred an occupation with entirely different functions to the one in which they were engaged. They were not merely seeking advancement, but were reaching out toward different activity.

Accepting the situation that there is general vocational dis-

satisfaction to a considerable degree, let us ask: Is this dissatisfaction just the absence of pleasant work experiences, that is, the absence of intrinsic job interests, or is it genuine disgust or unpleasant feeling accompanying the particular occupational tasks? In the study of the group of 500 men, dissatisfaction did not seem primarily to be due to the actual details of the working process. The dissatisfaction expressed seemed more the result of a general thwarted desire to be "somebody," either in the environment at large, or specifically in the occupation. Some of the remarks of these workers indicate the strength of this longing for superiority, for a maximation of personality.

1. A stenographer—"Have always had a subconscious hope to do some kind of literary work of an inspirational nature."
2. Office clerk—"Have an ambition to be a naval officer. At present I would enjoy a traveling position."
3. Drygoods clerk—"Would like to be an artist."
4. Stenographer—"I want to do something bigger."
5. Clerk—"I would like work with more initiative scope."
6. Accountant—"Dissatisfied because I desire better future."
7. Laborer—"I would like to learn a trade or profession so that I would not have to work with my hands all my life."
8. Mechanical engineer—"Wish to be a minister of religion."
9. Clerk—"I wish something requiring imagination and creative ability."
10. Bookkeeper—"Wish to be in business for myself."
11. Clerk—"Welfare work that includes public speaking."
12. Clerk—"I would like to secure a position in which I would have the guidance of others, or the planning of work, such as a department or plant manager."
13. Bank clerk—"I am sure I would be satisfied with the work I am doing if I had an opportunity to express myself."
14. Bookkeeper—"I would like to do limitless things."
15. Machinist—"I would like to be in business for myself."
16. Mechanic—"Go to foreign countries on secret service missions."
17. Salesman—"To write to influence the thoughts of others."

The implication of all these desires may be summed up in the statement of No. 13, a clerk, who is sure he would be satisfied if he had the opportunity to express himself.

In another study of these same 500 men (9) they were asked to indicate the general interests among a standard list, which

they considered most important in the choice of an occupation. Ambition, the desire for influence, power, or opportunity for success, took first place among these workers, although interest in the work for its own sake was a close second. From this analysis it would seem that industrial dissatisfaction is not usually due to the presence of an unpleasant feeling accompaniment of the occupational tasks; it is not due to any considerable degree to the actual details of the working process, but to thwarted ambition and the possibilities of becoming through one's vocation more and more a person. These are larger vocational interests.

The worker is interested in his vocation for various and numerous reasons. Intrinsic job interests are but one of them. It may be that these interests are the least important of the many interests of the worker in his vocation. Sentimentalists often hark back to the Golden Age before the industrial revolution when every man was intent upon producing splendid articles in which he felt the creative pride of an artist. Historically, we know this picture to be absolutely false, and knowledge of the continuity of human interests makes the industrial psychologist skeptical of the notion that the craftsman who made all of an article gained because of that a striking state of euphoria. Very likely he wished he was making a totally different article. Certainly, in these degenerate days great numbers of men are uninterested in the work they are doing. Dennison's contention (*4*) would appear to be right that the problem of industrial psychologists is to relate the worker to his total vocational environment so that he achieves satisfaction there.

THE INTRODUCTION OF MEASUREMENT. With the introduction of interest measurement into industry and education, theoretical statements of position are no longer accepted and made the basis of stimulation of development, as has been in the past. The general attack upon the influence of interests, with the interest factor not clearly defined, is passing. Interests are coming to be known as what the tests and inventories measure. In the use of these measures the important problem is not the relationship of interests and efficiency, or achievement, as has been indicated above. The value of interest measure-

ment lies in the beneficial results of an interest adjustment. These facts are discussed in the main text.

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APPENDIX II

SUBJECTIVE INTEREST (HISTORICAL)

SUBJECTIVE interest was early regarded as a factor in mental experience. Experience is a term which has been used technically in psychology to mean that of which we are conscious. Interest is thought of as pleasant feeling experience and aversion as unpleasant feeling experience.

Arnold (*1*, *2*) discusses the results of the introspective analysis of interest, and shows that interest has been regarded in various ways by psychologists, purely as feeling, as feeling in relation to thought experience, and as motivation or driving feeling with ideas of future reference. William H. Burnham (*3*) has pointed out this confusion in the use of the term interest, and has noted two predominant meanings: (a) interest as a "complex state of feeling" and (b) interest as a "permanent habit of preperception," or habit of thought with feeling, one merely an accompaniment or part of experience and the other a very complex moving experience dominated by feeling. It is with the total complex experience of interest that the applied psychologist is concerned in his work of industrial and educational adjustment. But of this habit of thought, called interest or aversion, the essential factor is *feeling* or affectivity, as pointed out by James Mill as early as 1869, and as stated by Stumpf in 1883, from whom authoritative quotations have been drawn by Ladd, Sully, Stout and others of the early experimental period prior to 1900 when the analysis of the interest experience was engrossing the attention of psychologists.

THE PSYCHOLOGICAL ANALYSIS OF THE INTEREST EXPERIENCE. The introspective study of the interest experience has been from two points of view, or perhaps three. One approach analyzes this experience into the elemental psychological factors which compose it. It has given us our understanding of interest as complex experience dominated by feeling. This

kind of study is known as structural psychology because it seeks to learn of what mental structure experiences are made. A second point of view is that of functional psychology, which has been concerned with the dynamic aspect, or the motivation of the interest experience. The third point of view is of more recent development, that of *Gestalt* psychology, which would investigate the interest experience as a whole. This point of view leads to the estimation of experience as liked or disliked.

It is from the structural analysis of interest that most of our knowledge is gained of this feeling experience. There is present in all of us the experiences which are caused by the stimulation of our sense organs, the eyes, ears, and so on. There are present the remembered experiences, the impressions due to past stimulation of our sense organs. And there are present the pleasant or unpleasant feelings, which are the essential factors of the interest and aversion experiences.

The individual's experience at any time is made up of the remembered impressions and of immediate impressions caused by the stimulation of the sense organs. But the feeling accompaniment of pleasantness or unpleasantness of this experience is not always present. When it is present the individual speaks of his experience as interest or aversion, according to the pleasant or unpleasant toning of the experience. So we have come to speak of the complex experiences as interests or aversions according to their pleasant or unpleasant affective accompaniment.

The pleasant or the unpleasant toning of the experience is not present in every mental experience. All experiences are not interests and aversions. There are experiences, new and old, which are without feeling, either pleasant or unpleasant. There is no feeling aroused by the passing of the average pedestrian, but there is a pleasant feeling, and interest, if the pedestrian is a friend.

INTEREST AND ATTENTION. From the point of view of the structural psychologist, attention would be regarded as clearness or vividness of the experiences of the individual. This clearness of mental experience, attention, may exist with or without the feeling accompaniment. If there is a pleasant feeling accompaniment to the experience, the experience is one of

interest. Attention is the clearness of this experience. If there is an unpleasant feeling accompaniment to the experience, the experience is one of aversion. Attention is the clearness of this experience. But feeling does not stand alone in experience. For this reason it is said to have no clearness. (*5, 6*) The clear factors of the interest experience are ideas and sensations. Feeling is always illusive, vague, and in an attempt to make it clear it vanishes. Feeling as a structural element in experience is said not to have the attribute of clearness. This is a theoretical point which does not enter into the description of the total interest experience as studied by the *Gestalt* psychologist.

Interest develops genetically along with attention. In education and industry the development of attention and the development of interest are thought of from the practical point of view as similar processes, although there are psychological distinctions noted. Arnold traces the development of interest through the stages of primary interest, secondary interest, and acquired interest (*2*, 200). Titchener discusses the development of attention (*5*, 265-276) as passing through three stages of primary, secondary and primary derived attention. These three stages are different complexities of the attentive processes. Primary attention is determined by various influences, such as bright lights, moving objects, loud sounds, bitter tastes, repeated pressures, and so on. These stimuli compel our attention. They are biologically adequate interests determining our attention. This is the form of attention, and of interest, that defines the mental life of the young child and the lower forms of life. Secondary attention is a stage of conflict in which there are two or more interests claiming ascendancy. Secondary attention is under difficulties. There are distractions. The period of training is a period of secondary attention. It is a stage of transition to derived primary attention when the conflict has vanished and the educational and vocational interests of a cultural life have the attention of the individual in their own right. Primary derived attention represents the individual at the stage of achievement with engrossing interests in the field of education or industry in which he is engaged.

From a functional or dynamic point of view, the interest

experience would be moving forward in development, and attention would be the focussing of this experience, the concentration of it. A functional analysis of interest would emphasize its genetic aspects. These are particularly significant in applied psychology but do not change the nature of interest or its relation to attention.

There is an age-old controversy over which comes first in mental experience, interest or attention. Interest is often spoken of as bringing about attention, as preceding and inviting attention. Is this so? To have experience, and, therefore, to feel, we must attend. Attention is a condition of our experience. It is a descriptive attribute of it. It cannot precede or follow. It is a part of our interest experience. This point was made clear by James Mill when he said in his *Analysis of the Phenomena of the Human Mind* that having an interesting sensation and attending to it are but two names for the same thing.

Degrees of Feeling Intensity. A feeling is said to have a certain degree of intensity (*5, 6*) which is the only quantitative attribute, besides that of duration, which feeling has been found to have. There are, then, two qualities of feeling, pleasantness and unpleasantness. The pleasant feeling is the essential component of the interest experience. The unpleasant feeling is the essential component of the aversion experience. But there are degrees of this feeling, or intensity of the feeling experience, which can be estimated in comparison with other experiences of a similar nature. Interests and aversions, then, are complex experiences. Interests are pleasant feeling experiences with degrees of intensity. Aversions are unpleasant feeling experiences, also with degrees of intensity.

The Dynamic Nature of Interest. Experience never stands still, nor does feeling. Interest and aversion exist as developments of mental activity. Nearly all of the early experimental psychologists were interested in what they called the volitional factor of the experience of interest and aversion. Interest is more than a pleasant thought. It is a train of pleasant thoughts. There is motivation or drive in the sequence. The German psychologist, Stumpf, spoke of interest (1883) as a desire to observe. With Stout, the English psy-

chologist (1896), interest and "conation" are the same thing. Interest is motivation or mental striving towards an end-state. William James (1890) developed in America this dynamic aspect of the interest experience. He criticized the structural school of psychologists who held that the direction of human experience comes from without, ignoring the significance of interest in shaping thought. He spoke of interest as a selective agent in all experience. *"My experience is what I agree to attend to.* Only those items which I *notice* shape my mind —without selective interest, experience is utter chaos. Interest alone gives accent and emphasis, light and shade, background and foreground—intelligible perspective in a word." (*4*, 402) Arnold (*1*, *2*) in summarizing the views of early psychologists comes to the conclusion that interest points to the future. It is dynamic. This experience which we term interest or aversion, while essentially a feeling experience, is a developing experience, one that will struggle through to an end result. It will be the clearest experience (attention) and the pleasantness or unpleasantness of the experience is the essential factor defining the experience. The modern conception of interest as motive or drive toward activity has been developed by Woodworth. (*7*, 202) Interests are placed alongside of the physiological drives as the forces motivating the individual in his perceptions and in the development of his skilled movements.

PRESENT DAY CONCEPTIONS. This historical survey indicates the theoretical definition of interests in psychology prior to the age of measurement. The measurement of interests, however, is making new distinctions. During the last ten years of research subjective interests have come to be regarded as complex configurations of feeling experience and the driving force of the experience is no longer considered to be a part of the interest factor being measured. The motivation factor in experience is considered separately. The criterion of interest is thought of as the feeling. These distinctions are discussed in the body of the text.

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APPENDIX III

HUBBARD'S SCORING KEY

Hubbard's Scoring Key of Mechanical Abilities for use with her Interest Analysis Blank for boys is given here as a matter of historical interest. Sixty-three items are scored and the mechanical interest score is the sum of the scores (at the top) which are assigned to the four symbols at the right of the items.

Items	*Score* 0	*Score* 1	*Score* 2	*Score* 3
Newspaper Reporter	U	L	D	O
Journalist	L	O	D	U
Hunter and Trapper	D	L	U	O
Chauffeur	L	O	U	D
Surgeon	U	L	D	O
Chemist	D	U	O	L
Employment Manager	L	U	D	O
Office Manager	U	L	D	O
Taking part in shows	U	L	O	D
Y.M.C.A. Secretary	L	U	D	O
Stock Broker	L	U	D	O
Meeting new people	O	L	U	D
Reading (school subject)	U	D	O	L
Druggist	L	O	U	D
Mining Engineer	U	D	O	L
"Life"	D	O	L	U
Auto Salesmen	L	U	D	O
Storekeeper	L	O	U	D
Picking fruit or vegetables	O	L	D	U
Going to call on people	L	O	U	D
Fat men	U	D	L	O
U. S. Army Officer	O	U	D	L
Energetic, lively people	U	L	D	O
Poet	U	L	D	O
Riding a bicycle	D	L	U	O
Auctioneer	L	O	U	D
Delivering packages or newspapers	L	U	D	O
Printing (school subject)	U	L	O	D
Animal Doctor	L	U	D	O
Orchestra Conductor	U	L	D	O
Factory Manager	U	L	O	D
Astronomer	O	U	D	L

Items	*Score* 0	*Score* 1	*Score* 2	*Score* 3
Specialty Salesman	L	U	O	D
Electrical Engineer	O	U	D	L
Fat women	U	D	L	O
Shop Foreman	U	L	D	O
Librarian	O	L	D	U
Woodwork (school subject)	U	L	O	D
Boy Scout Troop work	D	U	L	O
Geography	U	D	O	L
U. S. Navy Officer	O	U	D	L
Teamster	L	U	D	O
Playing cards	L	O	D	U
Editor	L	O	U	D
Talkative people	L	U	D	O
Novelist	L	U	O	D
Author	L	U	D	O
Going to the movies	L	D	U	O
Bookkeeper	L	U	D	O
Making large things	D	O	L	U
Scientist	U	O	D	L
Magazine Writer	L	U	O	D
Lawyer	L	O	U	D
Rancher	D	U	L	O
Artist	L	U	D	O
Proofreader	L	U	O	D
Architect	L	U	D	O
Office Clerk	L	O	U	D
Fireman	U	L	D	O
Traveling Salesman	U	L	O	D
Interviews	L	U	O	D
Police Officer	U	L	D	O
Street-car Conductor	L	U	O	D

The reliability coefficient of Hubbard's scoring key, computed for the primary group of seventh grade boys, upon which the scoring key was devised, is .87, which is a correlation between the odd item scores and the even item scores in the inventory, corrected by the Brown formula. For other groups, computed by the same method, and corrected for scatter, reliability coefficients are as follows:

Seventh Grade Boys	.76
Eighth Grade Boys	.78
Ninth Grade Boys	.75

APPENDIX IV

THE MINNESOTA SCORING KEY

The third Minnesota Scoring Key of Educational Abilities (for Men and Women), follows:

The Men's Key: Occupational items indicating superiority are to *like* accountant, chemist, college professor, consul, economist, factory manager, judge, mathematician, member of Congress, office clerk, office manager, philanthropist, philosopher, physicist, political scientist, preacher, private secretary, psychologist, statistician, translator (20), to *dislike* auto racer, railway conductor (2), and to be *indifferent* to athletic director, carpenter (2). General items indicating superiority are to *like* solitaire, chess, "Atlantic Monthly," "The Nation," "Merchant of Venice," "Addison's Essays," "A Christmas Carol," "Idylls of the King," algebra, arithmetic, geometry, physics, Latin (13), to *dislike* "Life," musical comedy (2), and to be *indifferent* to conservative people, baseball, bowling, amusement parks, detective stories, "Life," "Cosmopolitan," "Oliver Twist," "Little Minister," movies, musical comedy, Latin, Greek, civics (14). This is a total of 25 occupational items and 29 general items differentiating the superior men.

Occupational items indicating inferiority are to *like* athletic director, auto racer, aviator (3), to *dislike* astronomer, chemist, civil engineer, college professor, consul, high school teacher, inventor, judge, mathematician, philosopher, political scientist, statistician (12), to be *indifferent* to pharmacist, physician, painter, private secretary, grade school teacher, translator (6), and to mark *unknown* linguist, philanthropist, psychologist (3). General items indicating inferiority are to *like* conservative people, hunting, bowling, amusement parks, detective stories, "Life," "American Magazine," "Saturday Evening Post," "Cosmopolitan," "Oliver Twist," musical comedy, geography (12), to *dislike* checkers, solitaire, chess, picnics, conventions, "System," "Tale of Two Cities," arguing, algebra, arithmetic, Latin, Greek, English grammar, Spanish (14), to be *indifferent* to sociology (1), and to mark *unknown* botany (1). This is a total of 24 occupational items and 28 general items differentiating the inferior men.

The Women's Key: Occupational items indicating superiority are to *like* accountant, college professor, consul, foreign correspondent, labor arbitrator, linguist, magazine writer, orchestra conductor, philanthropist, poet, political scientist, retail merchant, statistician, translator (14), to *dislike* army officer, auto salesman, auto racer, auto

repairman, fisherman, lawyer, proofreader, railway conductor, secret service man, street car conductor, surgeon, traveling salesman (12), and to be *indifferent* to philosopher, scientific worker, tool maker (3). General items indicating superiority are to *like* taking long walks, "Merchant of Venice," "Addison's Essays," interviews, chemistry, Latin, history, French (8), to *dislike* detective stories, "Hamlet," movies, vaudeville (4), to be *indifferent* to thin men, basketball, hunting, tennis, football, skating, canoeing, domestic science, spelling (9), and to mark *unknown* "Oliver Twist," German (2). This is a total of 29 occupational items and 23 general items differentiating the superior women.

Occupational items indicating inferiority are to *like* auto salesman, auto racer, ship officer (3), to *dislike* college professor, linguist, magazine writer, political scientist, painter, private secretary, psychologist (7), to be *indifferent* to army officer, bank teller, consul, traveling salesman (4), to mark *unknown* certified public accountant, philanthropist, statistician, stock broker (4). General items indicating inferiority are to *like* basketball, hunting, billiards, dancing, vaudeville, domestic science (6), and to *dislike* checkers, chess, geometry, chemistry, botany, physiography, geography, Latin, Greek, spelling, German, Spanish (12). This is a total of 23 occupational items and 18 general items differentiating the inferior women.

The Common Key: Occupational items indicating superiority are to *like* accountant, astronomer, certified public accountant, college professor, consul, economist, employment manager, factory manager, foreign correspondent, inventor, judge, linguist, magazine writer, member of Congress, office clerk, office manager, orchestra conductor, philanthropist, physicist, politician, political scientist, statistician, translator (23), and to *dislike* army officer, auto salesman, auto racer, auto repairman, aviator, dentist, fisherman, proofreader, railway conductor, stock broker, surgeon (11). General items indicating superiority are to *like* taking long walks, checkers, chess, "The Nation," "Merchant of Venice," "Addison's Essays," geometry, chemistry, Latin (9), to *dislike* "Cosmopolitan" (1), and to be *indifferent* to bowling, driving an auto, amusement parks, botany, physiology, spelling (6). This is a total of 34 occupational items and 16 general items differentiating the superior.

Occupational items indicating inferiority are to *like* auto salesman, auto racer, auto repairman (3), to *dislike* college professor, foreign correspondent, high school teacher, inventor, magazine writer, office manager, philanthropist, political scientist, psychologist (9), to be *indifferent* to shop foreman, surgeon (2), and to mark *unknown* certified public accountant, linguist, philanthropist, philosopher, physicist, tool maker, watchmaker (7). General items indicating inferiority are to *like* conservative people, hunting, bowling, dancing, "Life," "American Magazine," "Saturday Evening Post," "Oliver Twist,"

vaudeville, musical comedy (10), to *dislike* checkers, chess, "Idylls of the King," symphony concerts, arithmetic, geometry, physiology, Latin, Greek, English grammar, German, French, Spanish (13), and to be *indifferent* to "Literary Digest," "A Christmas Carol" (2). This is a total of 16 occupational items and 25 general items differentiating the inferior.

APPENDIX V

WOMEN'S OCCUPATIONAL GROUPS

THE results of an extensive study of women's occupational interests by Manson at the University of Michigan (*3*), which had its beginnings as early as 1926 and which parallels the work of Strong upon men's occupational interests, have become available too late to be included in the text of this book, but will be summarized here in order that this development of the measurement of women's interests may be related to that which has gone before. There have already been mentioned (Chapter IV) the researches of Gaw (*1*) and Hogg (*2*), which, until this study, were the only investigations into the measurement of the interests of women. The conclusions of the earlier work upon women's occupational interests are in general verified. Women's occupational groups do not seem to be as closely knit together by their interests as do those of men. But there does seem to be a sufficient homogeneity of interests in a few rather broad occupational groups of women for the purposes of interest measurement.

MANSON'S INVENTORY AND SCORING KEYS. Manson (*3*) worked with a revision of the occupational interest section of the Carnegie Interest Inventory, which was prepared by her and is composed of 160 women's occupations.[1] The five symbol classification for the expression of feelings of L, l, ?, d, D is used, but in the analysis of results extreme and ordinary likes, or dislikes, were combined. The interest responses of a sample of 13,752 business and professional women (average age, 37.7 years) were analyzed and ten scoring keys have been devised by the Ream-Cowdery-Strong scoring method for groups as follows:

[1] Manson's "Occupational Interest Blank for Women" is published by Manson (*3*, 384-385) and is distributed for general use by the Bureau of Business Research, 208 Tappan Hall, Ann Arbor, Michigan. The scoring keys for use with Manson's inventory, which are discussed below, are distributed by the same publishers.

primary groups of 250 office managers, 250 bookkeepers, 500 stenographers, and 250 office clerks, which have been contrasted with a group of "women in general" composed of 7,958 non-clerical workers.

primary groups of 250 high school teachers and 500 grade school teachers, which have been contrasted with a group of "women in general" composed of 11,091 non-teachers.

a primary group of 250 trained nurses, which has been contrasted with a group of "women in general" composed of 12,886 non-health workers.

primary groups of 250 sales proprietors and 250 retail saleswomen, which have been contrasted with a group of "women in general" composed of 12,335 women not engaged in selling.[2]

The reliability of the scoring keys (*3*, 314-16) was secured by correlating the scores of the odd and the even numbered items, and correcting with the Spearman-Brown formula, for groups of 50 individuals for each of the ten occupations. Reliability coefficients range from .73 to .98 (mean .89, median 90.5), which are high for such a short inventory and satisfactory for measurement purposes.

VALIDATION OF THE SCORING KEYS. In the validation of the scoring keys (*3*, 316-45) 150 individuals were selected from each of the ten occupations as control groups. Fifty to one hundred and fifty of each of the control groups were taken from the primary groups upon which the scoring keys were devised. However, where there is possible a comparison of the old and new cases making up the control groups, there is found to be little difference in the selection of the "women of the occu-

[2] Strong's interest ratings are used in the application of these scoring keys, which are described in Chapter IV as follows: "A" for the 75 per cent scoring highest of the "occupation in question"; "B" for the 25 per cent scoring lowest. "C" for those scoring below any of the "occupation in question." The ten scoring keys and the critical scores for the lowest "A" ratings are as follows:

Private Secretary	50
Office Manager	50
Bookkeeper	30
Stenographer	40
Office Clerk	20
High School Teacher	40
Grade School Teacher	30
Trained Nurse	40
Retail Saleswoman	40
Sales Proprietor	40

"B" ratings are between zero and these scores, and "C" ratings are below zero.

pation in question." This seems peculiar on the face of it, but it may be due to the use of large primary groups in devising scoring keys. The following selection of the "women of the occupation in question" is made when the keys are applied to the control groups.

Private Secretary	83%	High School Teacher	73%
Office Manager	98%	Grade School Teacher	80%
Bookkeeper	85%	Trained Nurse	88%
Stenographer	91%	Sales Proprietor	46%
Office Clerk	77%	Retail Saleswoman	51%

The selection is high enough, with the exception of the two sales occupations, for the practical purposes of measurement.

A further measure of validation is necessary, however, to indicate the extent to which other occupations are selected by the scoring keys.

Sales Occupations. When scored with the Retail Saleswomen's Scoring Key, 35 per cent (mean and median) of the non-sales occupations are selected as having retail sales interests. The range for these occupations is from 27 to 48 per cent. For the Sales Proprietor's Scoring Key the situation is much the same. There is selected as sales proprietors, on the average (mean), 34 per cent (median, 32.5) of the non-sales occupations. The range for the non-sales occupations is from 26 to 46 per cent. Practically as many women bookkeepers are selected for sales interests by both the scoring keys as are sales people.

Evidently, women sales groups are not homogeneous in interests to a very high degree. Also, sales interests are found universally among the occupational groups which were studied. When scored with the scoring keys of the non-sales occupations (omitting nurses) the sales groups are found to have the interests of these non-sales groups to the extent of 42 to 63 per cent (mean, 53 per cent; median, 54.5 per cent). It will be recalled that the selection of the sales occupations by their own scoring keys was only 46 and 51 per cent.

To secure an indication of the selective value of these scoring keys, the average selection of non-sales occupations by the sales scoring keys may be subtracted from the selection made

of the "occupation in question." Thus, the selective value of the Sales Proprietors' Scoring Key is found to be 12 in 100 (46 per cent minus 34 per cent), and that of the Retail Saleswomen's Scoring Key as 16 in 100 (51 per cent minus 35 per cent). There is little basis for the differentiation of women sales occupations by their interests.

TRAINED NURSES. Trained nurses are the most homogeneous in their interests of the ten women's occupational groups studied by Manson. When scored with the Trained Nurses' Scoring Key the other nine occupations are found to have the interests of nurses from 15 to 38 per cent, with an average (mean) likeness of 23 per cent (median, 22 per cent). The extent to which other occupations have the interests of nurses is shown in Table CXVIII, where the percentage in the occupation above the critical score, and above the score of the 75 per cent scoring highest of the nurses in the primary group, are shown. The figures for trained nurses are for the control group.

TABLE CXVIII. PER CENT IN OTHER OCCUPATIONS HAVING INTERESTS OF TRAINED NURSE (MANSON)

Other Occupations	*Per Cent with Interests of Nurses*	*Per Cent with Interests of 75% of Highest Scoring Nurses*
Trained Nurse	88	75
All Non-Health Occupations (Mean)	*23*	*14*
Grade School Teacher	38	22
Sales Proprietor	37	25
High School Teacher	31	19
Retail Saleswoman	25	18
Bookkeeper	22	13
Office Clerk	19	10
Stenographer	17	6
Office Manager	15	6
Private Secretary	15	4

When trained nurses are scored for interests in the nine non-health occupations, they have the interests of other occupations from 17 to 52 per cent. They are nearest teachers in their interests; 50 per cent are selected by each of the teachers'

scoring keys. The average (mean) selection for the nine non-health scoring keys is 33 per cent (median, 41 per cent). But it is possible that other occupations, such as those in the social work field, might be found more closely related to nurses in their interests than any of the occupational groups studied here.

The Trained Nurses' Scoring Key selects, on the average, 23 per cent of non-health occupations along with the 88 per cent correct selections of nurses. Subtracting these errors gives a selective value for the nurses' scoring key of 65 in 100.

CLERICAL OCCUPATIONS. Specialized groups of clerical workers are found not to be distinguished from each other by their interests to a very high degree. When any of these occupational groups are scored with any one of the clerical occupational scoring keys (Private Secretary, Bookkeeper, Stenographer, Office Clerk, Office Manager) there is found to be between 60 and 90 per cent of the group selected as having the interests of the clerical occupation for which it is scored (mean, 77 per cent; median, 78 per cent). These percentages are nearly as high as those for the clerical occupations when scored for their own interests (mean, 87 per cent; median, 85 per cent). These facts are shown in Table CXIX.

Thirty-nine per cent (mean) of the non-clerical groups (median, 42 per cent) are selected by the clerical scoring keys. The range of selection of non-clerical groups for clerical interests is from 15 to 63 per cent. It will be recalled that the sales occupations had the interests of other occupations to a very high degree. Using teachers and nurses for comparison, there is a selection of these occupations on the average (mean) of 27 per cent (median, 24 per cent). The range is from 13 to 53 per cent.

Private secretaries are the most like non-clerical workers in their interests of any of the clerical groups. When scored with the High School Teachers' and Grade School Teachers' Scoring Keys 60 and 50 per cent of them are selected as having teachers' interests; with office managers, 49 and 36 per cent are selected by these keys; with bookkeepers, 42 and 36 per cent; with stenographers 50 and 43 per cent; with office clerks 48

and 42 per cent. Women teachers and clerical workers have a similarity in their interests, yet a considerable difference.

The selective value of the clerical occupational scoring keys may be estimated by subtracting the average number of selections for the non-clerical occupations from the average number of selections for the clerical occupations when scored for the occupation for which the scoring key was devised. Thus, the chances of correct selection are 48 in 100 (87 per cent

TABLE CXIX. PER CENT IN OTHER OCCUPATIONS HAVING INTERESTS OF CLERICAL WORKERS (MANSON)

Other Occupations	*Private Secretary*	*Stenographer*	*Office Manager*	*Bookkeeper*	*Office Clerk*
All Clerical Occupations except one for which Scored (Mean)	*74*	*79*	*86*	*72*	*75*
All Non-Clerical Occupations (Mean)	*52*	*39*	*33*	*37*	*38*
Teachers and Nurses (Mean)	*49*	*29*	*17*	*31*	*21*
Private Secretary	83	83	90	61	61
Stenographer	80	91	86	76	84
Office Manager	76	75	98	79	75
Office Clerk	73	79	80	70	77
Bookkeeper	67	77	87	85	79
Retail Saleswoman	59	63	52	56	60
Sales Proprietor	57	42	61	53	50
High School Teacher	53	31	22	17	17
Grade School Teacher	49	37	13	24	29
Trained Nurse	44	20	17	21	18

minus 39 per cent) when using all non-clerical occupations for computing the errors, and 60 in 100 (87 per cent minus 27 per cent) when using only the groups of teachers and nurses.

TEACHERS. The extent to which the other eight occupations have the interests of teachers when scored with the Grade School Teachers' Scoring Key and the High School Teachers' Scoring Key is shown in Table CXX. (See p. 476.)

Other occupations have the interests of Grade School Teachers from 36 to 51 per cent (mean, 44 per cent; median, 42.5 per cent), and of High School Teachers from 42 to 60 per cent (mean, 50 per cent; median, 49.5 per cent). As has already been pointed out, private secretaries, and clerical work-

ers in general, have the interests of teachers to a considerable degree. It is found also that teachers have the interests to some degree of clerical workers, and of private secretaries in particular. High school teachers have the interests of the eight non-teaching occupations from 17 to 53 per cent (mean, 28 per cent; median, 26.5 per cent). Grade School teachers have the interests of the eight non-teaching occupations from 13 to 49 per cent (mean, 31 per cent; median, 28.5 per cent). Neither of the teachers' scoring keys shows any differentiation of grade and high school teachers.

TABLE CXX. PER CENT IN OTHER OCCUPATIONS HAVING INTERESTS OF TEACHERS (MANSON)

Other Occupations	*Scored for Interests of Grade School Teachers*	*Scored for Interests of High School Teachers*
High School Teacher	69	73
Grade School Teacher	80	70
All Non-Teachers (Mean)	*44*	*50*
Private Secretary	50	60
Trained Nurse	51	52
Retail Saleswoman	51	51
Stenographer	43	50
Office Manager	36	49
Sales Proprietor	42	48
Office Clerk	42	48
Bookkeeper	36	42

The selective value of the teachers' scoring keys may be estimated by subtracting the average selections of non-teaching occupations from the correct selections of the teaching occupations. This gives 36 chances in 100 of correct selection for the Grade School Teachers' Scoring Key and 23 chances in 100 of correct selection for the High School Teachers' Scoring Key.

UNIVERSALITY OF INTERESTS IN WOMEN'S OCCUPATIONS. That there is a high degree of universality of interests throughout all the clerical occupations is evident from the foregoing; there is, as well, a high degree of universality of interests among the specialized teaching occupations. Manson (*3*, 338-41) finds that the common interest factor found in cler-

ical occupations is present among financial occupational groups. Five groups of women in financial work: treasurers (25 cases), assistant-treasurers (25 cases), secretary-treasurers (50 cases), assistant cashiers (25 cases), tellers (50 cases), were scored with the ten occupational scoring keys. The following are the percentages of these occupations which are, on the average (mean), like clerical workers in their interests:

Treasurers	81 per cent
Assistant-Treasurers	90 per cent
Secretary-Treasurers	77 per cent
Assistant Cashiers	88 per cent
Tellers	86 per cent

These occupations have the interests of any group of clerical workers to the extent of 68 per cent, or more, and all of them have, on the average, the interests of clerical workers to the extent of 84 per cent (mean and median). When it is recalled that the clerical occupational scoring keys correctly select 87 per cent (mean) of their own groups, it will be seen that the clerical scoring keys are just as effective in the selection of financial occupational groups. Financial occupational groups are as like any clerical occupation in their interests as is any other clerical occupation. A group of 50 women partners in retail stores was also found to have the interests of the various clerical occupations from 60 to 80 per cent (mean, 66 per cent). There is a high degree of universality of interests running throughout the financial and clerical women's occupations.

Several specialized educational groups were studied by Manson (*3*, 342-4) in the same manner: educational school supervisors (50 cases), grade school principals (50 cases), high school principals (50 cases), normal school instructors (50 cases), college instructors (25 cases), librarians (50 cases). Seventy-three per cent of educational supervisors have the interests of grade and high school teachers (average); 77 per cent of grade school principals; 78 per cent of high school principals; 82 per cent of normal school instructors; 74 per cent of college instructors; 70 per cent of librarians. There is an average (mean and median) of 76 per cent of these groups who have the interests of teachers. The High School and

Grade School Teachers' Scoring Keys select their own occupational group to the extent of 73 and 80 per cent respectively. Other teaching groups are selected with a similar correctness. There is, it would seem, a high degree of universality of interests throughout women's teaching occupations.

Sixty-five per cent of a group of 50 executive secretaries were found to be like teachers in interests (*3*, 345). Also, a large percentage of the teaching groups are selected as private secretaries (mean, 55 per cent; median, 57 per cent). There is a similarity of interests between teachers and clerical workers which has already been pointed out.

USES OF MANSON'S OCCUPATIONAL SCORING KEYS FOR WOMEN. Manson's clerical scoring keys, teachers' scoring keys, and nurses' scoring keys of women's occupations would seem to be useful for the practical purposes of the interest examination, when used with an understanding of their limitations. The trained nurses' scoring key will select 65 per cent of trained nurses from non-health groups, with errors eliminated. The clerical keys will select 48 per cent (on the average) of clerical workers from non-clerical workers, with errors eliminated. The Grade School Teachers' Scoring Key will select 36 per cent and the High School Teachers' Scoring Key 23 per cent of these groups of teachers from non-teachers. In all cases, the differentiation indicated here is one of a certain women's occupational group from a number of dissimilar occupational groups.

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